SUPPLEMENTAL DEVELOPMENT PERMIT APPLICATION FOR CERTAIN LAND USES AND LARGE SCALE DEVELOPMENTS

Marlboro County, South Carolina

This application must be complete and submitted in person to the Marlboro County Planning Department in order to apply for a Supplemental Development Permit. **The application will be returned to the applicant within fifteen (15) working days if the following items are not submitted with the application or if they are found to be inaccurate:**

1) Copy of **Current Recorded Deed** to the property (owner's signature must match documentation). If the applicant is not the owner of the property, the **Current Property Owner(s)** must sign and print the Designation of Agent found below.
2) A **letter of intent** signed by the applicant or property owner(s) explaining in detail the reason for the applicant's request for a supplemental development permit. The letter of intent shall include a demonstration that the proposed use of the property meets the four (4) criteria set forth in Section 5-3.1 of the Marlboro County Zoning Ordinance (the "Ordinance") (a copy of the Ordinance can be obtained from the Marlboro County Planning Department). The letter of intent must include specific information regarding each of the four (4) criteria in Section 5-3.1. In addition, the letter must include a demonstration that the proposed use meets the additional criteria for the specific use set forth in Sections 5-4 to 5-15 of the Ordinance. For example, a letter of intent for a proposed Mining and Extraction operation (Section 5-2(5)) must include a demonstration that the proposed Mining and Extraction operation meets the four (4) criteria set forth in Section 5-3.1 as well as the three (3) criteria set forth in Section 5-8 of the Ordinance.
3) An accurate, legible **Site Plan drawn to Engineers Scale** must be attached. The site plan must show property dimensions, dimensions and locations of all existing and proposed structures and improvements, parking areas, wetlands, holding basins and buffers when applicable. Please attach **one 24 x 36 copy and one 11 x 17 copy**.
4) Copy of a legible **Approved and Recorded Plat** showing present boundaries of property.
5) **Fee: $100.00** check made out to "Marlboro County, South Carolina" or cash or credit.

RECEIVED
AUG 28 2009
BY: RTEA

Applicant Name: MRR Sandhills, LLC

Mailing Address: 431 Raleigh View Rd.

City, State, Zip Code: Raleigh, NC 27610 Daytime Phone: 919-835-3655

Present Use of Property: Timberland/Agricultural

Supplemental Development Description: Sanitary Landfill

MANAGER — 8/13/09

Applicant Signature Date

Designation of Agent (complete only if owner is not applicant):

I hereby appoint the person named as Applicant above as my (our) agent to represent me (us) in this application.

Z.V. Pate, Inc., August 12, 2009 Post Office Box 159

Owner Print Name Date Owner Mailing Address

Owner's Representative: David Burns, Z.V. Pate, Inc. CEO

David F. Burns - CEO Laurel Hill, NC 28351

Owner Signature City, State, Zip Code

FOR OFFICE USE ONLY:

Application #: _____ Fee Paid ($__): _____

Date Filed: _____ Zoning Officer: _____

August 27, 2009

Susan E. Rivers, Clerk
Planning/Zoning Department
County of Marlboro
Post Office Box 419
Bennettsville, SC 29512

Re: MRR Sandhills, LLC
Letter of Intent for a Municipal Solid Waste Landfill
Supplemental Development Permit Application

Ms. Rivers:

This letter will serve as a Letter of Intent for siting a municipal solid waste landfill corresponding to the requirements as set forth in the attached *Supplemental Development Permit Application for Certain Land Uses and Large Scale Developments.* Below we have demonstrated that the proposed use of the property meets the four (4) criteria set fourth in Section 5-3.1 of the Marlboro County Zoning Ordinance (the "Ordinance"). This Letter of Intent includes specific information regarding each of the four (4) criteria in Section 5-3.1. In addition, the letter includes a demonstration that the proposed use meets the additional criteria for landfills set forth in Sections 5-4.

According to Section 5-3.1 of the Ordinance, the Board of Zoning Appeals shall consider Items 5-3.1 (1-4) in it's deliberations of a Supplemental Development Permit Application request. For ease and clarity for the Board these items are in ***bold italics*** and the MRR Sandhills, LLC's (MRR) response immediately follows.

5-3.1(1) The relationship of the proposed use with respect to the County's Comprehensive Plan:

The County's Comprehensive Plan (adopted 9/13/2001) does not specifically address landfills. However, it does indicate that some "industrial uses should be properly and effectively buffered from surrounding non-industrial uses". This criterion is met by the zoning requirement that states "No such use, building, structure or other improvement shall be located within 2,500 feet, measured in a straight line, of any existing residential, or outdoor recreational use". Further, the site will ultimately meet all additional buffer

requirements established by South Carolina Department of Health and Environmental Control (DHEC) to protect human health and the environment.

This condition is adhered to. Please see Attachment 1, the Proposed Site Plan. In addition, the site is consistent with the Land Use Goals and Industrial Location Standards set out in the Comprehensive Plan, as described in the attached information submitted in support of the request to rezone the site (Attachment 2).

5-3.1(2) ***The impact of the proposed use on the street system, with particular reference to automotive and pedestrian safety and convenience, traffic generation, flow and control, and access in case of fire or catastrophe, such as not to be detrimental to existing or anticipated uses, either adjacent to or in the vicinity of the proposed use:***

The proposed landfill facility may have access from SC Highway 177 or Osborne Road (NC State Road 1803). The chosen entrance location will be determined based on detailed engineering and environmental studies including Army Corps of Engineers approved stream and wetland delineations. Preliminary investigations and inquiries suggest that both of the proposed/alternative entrances are located on underutilized, rural roadways that can accept the anticipated traffic flow with negligible impact to the transportation infrastructure ("street system"). Additionally, automotive and pedestrian safety, and convenience, will not be negatively impacted. Neither anticipated roadway has appreciable pedestrian traffic. The anticipated risk to pedestrians is negligible.

Moreover, traffic generation, flow, and control is highly scrutinized (and regulated) by the respective Departments' of Transportation in SC and NC. These issues will be addressed and specifically governed through application for and issuance of an Encroachment Permit from the appropriate agency. This permit will be required to access the area road system. A requirement of the Encroachment Permit will be a Traffic Investigation Study. The study will entail a full investigation including:

- A description of the study area including surrounding land uses and expected development in the vicinity that would influence future traffic conditions.
- Description of the current and proposed land uses.
- Description of existing traffic conditions including existing peak-hour traffic volumes adjacent to the site and levels of service for intersections in the vicinity.
- An estimate of future background traffic.
- An estimate of trip generation.
- Trip Distribution (inbound versus outbound, left turn versus right turn) and traffic assignment.
- Analysis and an estimate of impact at each of the study intersections and access intersection locations.

- Access management standards including site distance limitations, adjacent driveways and intersections.
- Proposed, if any, improvements or access management techniques that will mitigate any changes in level of service.

Only upon issuance of an encroachment permit satisfying all of the agency requirements will MRR be allowed to access Highway 177 or Osborne Road.

The nearest Fire Department and EMS Services is located in Wallace, South Carolina. In addition, a limited amount of fire fighting capabilities and trained personnel will be located on site. On-site access, including all-weather roads and equipment to maintain the same are essential to the proposed business use and will assure full time access to the site by emergency vehicles for potential fire and/or catastrophe.

The following table is from the SCDOT Access and Roadside Management Standards Manual (2008 Edition, Table 3-3) and is provided as an example of the "driveway classifications" applicable to the MRR project. It is anticipated that MRR will apply for a "medium volume" driveway based on our estimated flow of traffic.

Driveway Classification	Expected Trips	Example Land Use	Design Features
Low Volume	1-20 trips/day 1-5 trips/hour	Residential Drives (1-2 single family homes)	Typically designed with minimum requirements.
Medium Volume	21-600 trips/day 6-60 trips/hour	Small subdivisions with single family homes or apartments, small business or specialty shop	Typically designed with some higher volume features such as radial returns.
High Volume	601-4,000 trips/day 61-400 trips/hour	Convenience store, gas stations, or small shopping center	Typically designed with high volume features such as radial returns and turn lanes.
Major Volume	>4,000 trips/day >400 trips/hour	Large shopping center or regional mall	Designed with high volume features including radial returns, turn lanes, and medians.

5-3.1 (3) The impact of the proposed use on nearby property.

The proposed landfill will be regulated by DHEC with the primary objective to assure protection of human health and the environment. Further, Article V Section 5-4(1) of the Ordinance requires "No such use, building, structure or other improvement shall be located within 2,500 feet, measured in a straight line, of any existing residential, or outdoor recreational use." This exceeds DHEC's requirement of a 1,000 foot buffer from the same items. Further, air quality, groundwater, and surface water will be heavily regulated by DHEC to assure protection of public health, safety, and welfare.

Based on the above criteria coupled with the requirements of any necessary traffic mitigation plan, there is no reasonable expectation of adverse impact to nearby property.

The proposed facility is located in a remote area of Marlboro County with less than ten citizen-occupied residential dwellings within a half-mile of the site. The town and community of Wallace are located approximately eight miles southwest of the proposed landfill.

The proposed facility will be located on approximately 1050 acres owned by Z.V. Pate, Inc. of Laurel Hill, NC. The site currently covers six parcels of land in Marlboro County either in part or entirety as discussed elsewhere in this application. The facility boundary is largely surrounded by additional acreage owned by Z.V. Pate, Inc. and/or other entities managing their property as timberland. There are only two residential tracts in Marlboro County which are contiguous with the proposed facility boundary. These tracts are located at the northwest corner of the site and across the CSX rail line from the Z.V. Pate, Inc. property.

The waste disposal "footprint" of the facility will be no more than 300 acres when the site is fully developed in an estimated 25 to 30 years. This constitutes less than 30% of the total facility acreage, with most of the remaining acreage being maintained and managed as forested buffers. With hundreds of acres of forested land between the facility and existing residences, the future facility should not be perceptible to sight, or create any perceptible sound or odor.

Because of state-of-the-art groundwater protection systems, and the required DHEC buffers between wetlands and water bodies, there is no material danger to ground or surface waters. The existence of wetlands and streams and the impact to those bodies by this facility are governed by exceedingly strict regulations promulgated and administered by the United States Government through its Army Corps of Engineers and the State of South Carolina through its Department of Health and Environmental Control (DHEC). Whether or not streams or wetlands exist and the potential impact this facility might have are issues that are properly handled by those agencies that are trained to

administer the regulations and to identify the issues and mandate mitigation where appropriate.

On the issue of potential impact of the proposed use on nearby property values, MRR recognizes that some citizens are unaware of the tremendous changes in the regulations and technology involving waste disposal, and that there are some who assume that high quality economic growth is not possible or desirable near a solid waste facility. Contrary to that belief, there are countless examples of modern facilities where high quality/high end land uses have moved towards an existing landfill, in many cases locating as close as possible without penetrating the facility boundary. In each of those cases, economic value has not been harmed, and harmony is not determined by similarity of use but rather by function. In other words, the solid waste facility does not logically impede the enjoyment or use of other adjoining or adjacent uses within the area. Increasingly, the evidence is that a moderm landfill simply does not impede residential, commercial, recreational, educational, or other such uses on adjacent or nearby tracts, and it therefore is harmonious. In an era when land use experts are demanding more and more "mixed use" development, it no longer is a given that a solid waste facility must be fully separate and segregated from other community uses in order to be in harmony with the character of the area.

Attachment 3 to this letter is a report titled *Solid Waste Landfills and Residential Property Values* prepared by the National Solid Waste Management Association. This report highlights many of the misconceptions related to solid waste management facilities and their impact upon property values.

5-3.1 (4) ***The suitability of the affected site in terms of size, shape, and topographic conditions to accommodate the proposed use, building or development and to ensure environmental compatibility.***

The proposed site is approximately 1,050 acres, subject to final survey, and shaped such that a landfill can be designed and constructed in a manner that will assure protection of public health, safety, and welfare. The topography of the proposed site is generally level to moderately steep but is steeper on side slopes near potential wetland areas. The steeper areas typically will be located outside of the developed landfill area.

Based on the above, the proposed site is suitable for the intended use. Additionally, DHEC must evaluate and approve the geotechnical and hydrogeologic data for this site during its site suitability study, further ensuring that the site meets the health and environmental standards for the proposed activity.

The Ordinance further requires landfills to comply with the development standards presented in Section 5-4 (1-4). Again, for ease and clarity for the Board these items are in ***bold italics*** and MRR's response immediately follows.

5-4 (1) ***No such use, building, structure or other improvement shall be located within 2,500 feet, measured in a straight line, of any existing residential, or outdoor recreational use.***

These conditions shall be adhered to as indicated in Attachment 1 - Proposed Site Plan.

5-4 (2) ***A geotechnical engineering firm shall render a written opinion that, to the best of their professional judgment, the rock formations being used to contain the waste are impermeable and that the surrounding groundwater sources will not be contaminated (applies to landfills only)***

The required written opinion is provided as Attachment 4 to this letter.

5-4 (3) ***A drainage and sedimentation plan shall accompany the request, showing all off-site runoff (applies to landfill only).***

The required plan is provided as Attachment 5 to this letter. The Proposed Site Plan (Attachment 1) identifies off-site runoff.

5-4 (4) ***The facility shall be enclosed by an opaque fence or wall structure illustrated be Section 4-7(2), on all sides visible from the road or street serving the facility and an opaque cyclone fence on the remaining unexposed boundaries.***

This condition will be adhered to.

Additional Application Information

Attachments 6 and 7 are the current recorded deeds for the property, and a copy of the approved and recorded property plat, respectively. The properties subject to this application are owned by Z.V. Pate, Inc. The proposed landfill facility boundary encompasses four tax parcels in total (parcels ending with designations -004, -007, -038, and -058); and portions of two additional tax parcels (ending with designations -039, and -040). The affected tracts will ultimately be combined and/or subdivided to form one new tax parcel. Note that while the application requires that "current recorded deeds" for the property be submitted, the County has no recorded deed for parcel 03-01-02-039. Certified copies of all remaining deeds are provided in Attachment 3, as mentioned above.

On behalf of MRR I would like to thank you in advance for your consideration of this application. Please contact me by email at fnhector@mrrsouthern.com or by phone at 919.835.3575; or contact MRR's Project Manager, Dan Moore by email at dmoore@mrrsouthern.com or by phone at 336.253.0091 if you have any questions or comments.

Sincerely,
MRR SANDHILLS, LLC

F. Norbert Hector, Jr.
Managing Member

cc: David L. Burns, CEO, Z.V. Pate, Inc.
Daniel R. Moore, Project Manager, MRR Sandhills, LLC

Attachments

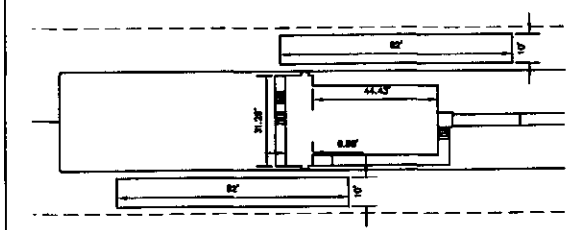
NOTES:

REFERENCE IS MADE TO THE FOLLOWING:

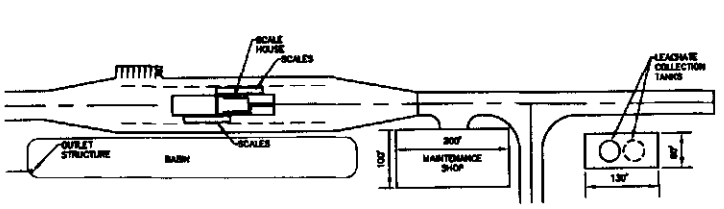
1. NO TOPOGRAPHIC OR BOUNDARY SURVEYS HAVE PERFORMED BY BP BARBER. ALL FEATURE LOCATIONS SHOWN ARE APPROXIMATE.
2. ALL ELEVATIONS SHOWN ARE BASED ON MEAN SEA LEVEL DATUM.
3. ALL EXISTING UTILITIES SHOWN ARE APPROXIMATE AND MUST BE FIELD VERIFIED PRIOR TO CONSTRUCTION. OTHER UTILITIES MAY NOT BE SHOWN ON THESE PLANS. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR THE LOCATIONS SHOWN AND IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THE LOCATIONS OF ALL UTILITIES WITHIN THE LIMITS OF WORK.
4. BOUNDARY INFORMATION IS APPROXIMATE; BASED ON TAX MAPS, AERIAL IMAGES AND USGS MAPS.
5. ALL ILLUSTRATED SITE STRUCTURES ARE APPROXIMATE IN SIZE AND LOCATION, SUBJECT TO FINAL DESIGN AND PERMIT APPROVALS.
6. ALL DEVELOPED STRUCTURES WILL BE CONSTRUCTED NO LESS THAN 2,500 FEET, MEASURED IN A STRAIGHT LINE, OF ANY EXISTING RESIDENTIAL OR OUTDOOR RECREATIONAL USE AND WILL BE DEFINED ON FINAL SURVEY.

PARCEL ID#	APPROX. ACREAGE USED	APPROX. TOTAL ACREAGE
03-01-02-038	71.70	71.70
03-01-02-039	885.44	1162.50
03-01-02-04	28.70	28.70
03-01-02-040	20.30	285.00
03-01-02-058	22.54	22.54*
03-01-02-07	23.00	23.00

NOTE: TOTAL ACREAGE IS FROM TAX MAPS FOR EACH PARCEL EXCEPT AS INDICATED BY (*).



SCALE HOUSE INSET
SCALE 1" = 30'



STRUCTURES INSET
SCALE 1" = 100'

LEGEND

- CREEK
- EXISTING PARCEL LINE
- 2,500' RESIDENTIAL RADIUS
- LANDFILL FOOTPRINT
- PROPOSED PROPERTY LINE
- POTENTIAL WETLANDS

NORTH

THIS DRAWING IS PLOTTED AT REDUCED SCALE

GRAPHIC SCALE

REVISIONS

NO.	DESCRIPTION	DATE	BY

APPROVALS
PROJECT MGR
DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SEAL

SIGNATURE

bpb
BP Barber
Engineering • Experience • Excellence
COLUMBIA • GREENVILLE • CHARLESTON
FLORENCE • CHARLOTTE • SAVANNAH

TITLE SHEET
PROPOSED SITE PLAN
DATE: AUG. 2009
SCALE: AS SHOWN

PROJECT
PROPOSED LANDFILL
FOR
MRR SANDHILLS, LLC
MARLBORO COUNTY SOUTH CAROLINA

JOB NO.
FILE NO.
REF.
PROJECT NO.
05748N
SHEET
1
1

FILE NO.

Attachment 2

Supplemental Information in Support of MRR Sandhills, LLC Request to Rezone Certain Property in Marlboro County, SC

Supplemental Information in Support of MRR Sandhills, LLC Request to Rezone Certain Property in Marlboro County, SC

August 2009

MRR Sandhills, LLC submits the following additional information in support of the request to rezone certain property (the "Property") from GD (General Development District) to RR (Rural Resource District). The request to rezone the Property is appropriate based upon the criteria set out in Section 10.5 of the Zoning Ordinance:

10.5.1 The relationship of the request to surrounding land uses and the County's Comprehensive Plan;

The proposed facility is located in a remote and sparsely populated area of Marlboro County with less than ten citizen-occupied residential dwellings within a half-mile of the site. The town and community of Wallace are located approximately eight miles southwest of the proposed landfill.

There are no residential developments located adjacent to or near the Property, and no residence is located within 2,500 feet of the proposed landfill uses on the Property (exceeding DHEC's buffer requirement by a factor of more than 2). There are only two residential tracts in Marlboro County which are contiguous with the proposed facility boundary. These tracts are located at the northwest corner of the site and across the CSX rail line from the Z.V. Pate, Inc. property. The other parcels of land surrounding the Property are currently either forested or agricultural, and all such properties are zoned General Development (GD). There are no sanitary landfills currently located within the County, and the proposed landfill is anticipated to be the only landfill of any type located in the County.

The use of the Property as a sanitary landfill meets each of the Land Use Goals set out in the Marlboro County Comprehensive Plan, and is otherwise consistent with the Comprehensive Plan:

1. **To encourage and accommodate a complete range of potential land uses in the County;**

At the current time, there are no sanitary landfills located within Marlboro County. The Zoning Ordinance specifically references sanitary landfills and the ability to cite a sanitary landfill within Marlboro County. The landfill proposed by MRR will comply with all requirements set out in the Zoning Ordinance with respect to sanitary landfills, and in doing so will comply with what this County Council has decided are the important factors for siting a landfill in Marlboro County.

2. **To ensure that the future development of land will not adversely affect neighboring property or uses;**

   Development of the Property as a sanitary landfill will have no adverse effect on neighboring property or uses. This use is clearly consistent with the Marlboro County Comprehensive Plan, as the Plan (and the Zoning Ordinance) make clear that landfills are appropriate in rural areas, subject to appropriate buffers and other protections for surrounding landowners. Because the landfill will meet all such criteria, it is completely consistent with the Comprehensive Plan and the Zoning Ordinance. As such, use of the Property as a landfill will provide an environment that is efficient for landfill purposes, and also sensitive to surrounding development.

3. **To protect the property rights of the individual to the extent these rights do not infringe upon the property rights of others;**

   As described above, siting a sanitary landfill on the Property will not infringe on the property rights of others. The landfill uses on the Property will be appropriately buffered, screened from view, and otherwise separated from surrounding properties.

4. **To ensure that urban development is provided urban services and that such development does not occur in areas which lack public water and sewer;**

   The proposed landfill will not be an urban development, as it is located far from any city or town center. However, the services necessary for the landfill will be available to MRR.

5. **To restrict development in flood hazard areas;**

   The Property on which the sanitary landfill will be located is not in a flood hazard area. Furthermore, the Property will be subject to a properly submitted and approved NPDES Stormwater Management and Sediment Control Permit. Additionally, as a condition of that NPDES Permit, MRR will implement Best Management Practices on the Property. In its submission to the Marlboro County Board of Zoning Appeals, MRR has submitted a

drainage and sedimentation plan that outlines how MRR will meet all the stormwater and drainage requirements applicable to its operations on the Property. A copy of MRR's request is Attachment A, hereto and incorporated herein by reference.

6. **To protect natural resources from development when feasible, particularly prime farmland and forest resources.**

   This Property has not been designated as "prime farmland" or "prime forest resources" by the Comprehensive Plan, the Zoning Ordinance, or any other County governing document. Indeed, the current zoning designation on the Property – GD, General Development – would allow the Property to be developed for many residential and commercial uses.

7. **To ensure adequate transportation facilities and to protect major routes from development which is ill-timed, adverse, unsightly, or congesting;**

   Adequate transportation facilities currently exist for the Property. A railroad line runs along a border of the Property, and the Property has access to Highway 177. The use of the Property will not overburden the existing transportation facilities of the County. Nor will the facility adversely affect existing automotive and pedestrian safety. Applicant will be required to obtain an Encroachment Permit to access the area road system, a process which will entail a Traffic Investigation Study. That process is described in more detail in Attachment A.

   As described above and herein, the uses on the Property will be adequately buffered and screened from view by adjacent properties.

8. **To promote economic expansion through developing properly planned and protected industrial areas;**

   The sanitary landfill will undoubtedly promote economic expansion in Marlboro County. MRR will provide a sanitary landfill for all of the residential solid waste generated in Marlboro County—at no disposal charge to the residents of Marlboro County.

   To the extent that a sanitary landfill is an industrial area, development on the Property will undoubtedly be properly planned and protected. This document has already described the buffer, screening, and stormwater/sedimentation protections that the Property will provide. In addition, a significant amount of planning will be involved with the sanitary landfill, as part of the South Carolina Department of Health and Environmental Control (SCDHEC) permitting process.

9. **To provide a proper environment for commercial activity – an environment that is efficient and is sensitive to surrounding development and investment;**

   The permit process and the requirements applicable to the Property pursuant to the Supplemental Development approval process will ensure that this goal is met. The environment will certainly be efficient, as the sanitary landfill will incorporate state of the art procedures and practices for waste disposal, and a host of best practices related to storage, groundwater and sediment control, etc.

   The sanitary landfill will be very sensitive to surrounding development and investment. None of these uses will be located within 2,500 feet of any residence, and the uses will be properly shielded from view.

   The waste disposal "footprint" of the facility will be no more than 300 acres when the site is fully developed in an estimated 25 to 30 years. This constitutes less than 30% of the total facility acreage, with most of the remaining acreage being maintained and managed as forested buffers. With hundreds of acres of forested land between the facility and existing residences, the future facility should not be perceptible to sight, or create any perceptible sound or odor.

   Because of state-of-the-art groundwater protection systems, and the required DHEC buffers between wetlands and water bodies, there is no material danger to ground or surface waters. The existence of wetlands and streams and the impact to those bodies by this facility are governed by exceedingly strict regulations promulgated and administered by the United States Government through its Army Corps of Engineers and the State of South Carolina through its Department of Health and Environmental Control (DHEC). Whether or not streams or wetlands exist and the potential impact this facility might have are issues that are properly handled by those agencies that are trained to administer the regulations and to identify the issues and mandate mitigation where appropriate.

10. **To ensure quality of living environment for residential areas;**

    The proposed sanitary landfill will have no adverse effects on residential areas in the County. The landfill uses will be located almost ½ mile from any residential structure, and substantially farther away from established residential development uses.

11. **To manage growth and development in a manner which achieves an efficient, well-ordered, well-balanced and equitable development pattern that serves the needs and protects the investment of all residents and economic interests (including industrial, commercial, agricultural and private residential investment);**

    The proposed sanitary landfill will serve the needs of the County by providing reliable solid waste disposal services and a variety of economic benefits, including host fees, tax revenues, job creation, and infrastructure improvement. The landfill will also protect the interests of all residents and economic interests existing in the County by meeting or exceeding all land use requirements established by the County, and all permitting and operations requirements established by DHEC.

Furthermore, the proposed sanitary landfill is consistent with the Industrial Location Standards set out in the Comprehensive Plan:

1. **Prime industrial locations should be in areas protected from encroachment by other uses.**

   The Property will be buffered and shielded from view in a manner consistent with the Zoning Ordinance. As a result, other uses will not encroach upon the landfill site.

2. **Land designated for industrial and related activity should be reasonably level (preferably with not more than five percent slope) and not swampy or subject to flooding and capable of bearing appropriate loads;**

   The Property is reasonably level, particularly in the areas to be employed by the landfill. The Property is not swampy, and in any event will be subject to a properly approved NPDES Sediment and Stormwater Permit issued by DHEC. In connection with the application to site a landfill on the Property filed with the Marlboro County Board of Zoning Appeals, a geotechnical engineering firm has issued a written opinion that the rock and soil formations underlying the site are entirely suitable for the proposed use and that the surrounding groundwater sources will not be contaminated. A copy of that letter is attached hereto. The Property is clearly capable of bearing the loads appropriate for a landfill.

3. **Preferably, such uses should take place on tracts of land which are otherwise suitable for industrial location;**

   As discussed throughout, a landfill is an appropriate use for this tract of land, in view of its size, topography and rock formations, proximity to surrounding

uses and structures, access to transportation, availability of utilities, and various other factors as described herein.

4. **Industrial and wholesaling activity should be concentrated in growth centers where possible, rather than individually scattered throughout the County;**

   The Property has been selected for a landfill because of its ability to meet the requirements set out in the Zoning Ordinance. It will be the only landfill sited in the County.

5. **Industrial uses should be properly and effectively buffered from surrounding non-industrial uses. Special attention should be paid to isolating nuisance-causing industry, especially those with hazardous materials;**

   The Property will be buffered from surrounding properties and uses in a manner that meets the specific requirements of the Zoning Ordinance. The landfill will only accept municipal solid waste and will not accept any hazardous waste. The DHEC permitting process and the buffer requirements will ensure the landfill does not create any nuisances. Furthermore, the distance of the landfill from any residence or residential road will strengthen this protection.

6. **Industrial uses should be located in and/or provided with direct access to major highway routes; and**

   The landfill will have direct access to SC Highway 177 and/or Osborne Road (NC State Road 1803), as well as a railroad spur that runs along one boundary of the Property.

7. **Since industrial operation may use large quantities of water and create wastes in substantial volume, industrial uses should be provided where utilities are available or where they can be installed without incurring excessive public or private costs. This suggests sites in or near urban activity areas, current or proposed.**

   The landfill will not use large volumes of water or create wastes in substantial volume, and as a result should not overburden existing utility services or other public services provided in the County, or cause the County or any person to incur excessive costs. Efficient operation of the facility is not dependent upon the use of public water and waste water resources. Water quantities necessary for operation can be found upon the site utilizing potable water wells, and waste water is capable of being handled by on-site

treatment measures. Electrical utility connection is available and all costs for obtaining access will be borne by MRR.

10.5.2 Whether the uses permitted by the proposed change would be appropriate;

The Zoning Ordinance specifically allows sanitary landfills to be sited on parcels zoned Rural Resource (RR), subject to the supplemental development standards contained in the Zoning Ordinance. MRR has already sought approval from the Board of Zoning Appeals for the proposed use, and the sanitary landfill will meet all such supplemental development standards. The Zoning Ordinance's specific inclusion of sanitary landfills as a permitted use in a Rural Resource (RR) district demonstrates that a sanitary landfill is an appropriate use in an RR district.

As described elsewhere herein, a landfill is not only appropriate for this parcel, but appropriate with respect to surrounding properties, existing infrastructure, economic development, and the general welfare of the County and its citizens.

10.5.3 Other circumstances and conditions affecting the property, surrounding land and the County at large.

The Property is optimal for the siting of a sanitary landfill. As described above, the Property enjoys appropriate access to transportation, available electrical utilities, and the proposed landfill use will maintain the required buffering from neighboring properties, obtain and maintain appropriate and approved stormwater and sediment management, as well as all appropriate permits by DHEC. As demonstrated in the Supplemental Development Application, a geotechnical engineer has issued a written opinion that surrounding groundwater sources will not be contaminated by the landfill.

Use of the property as a landfill will have a significant positive economic impact for the County. Locating a sanitary landfill on the Property strikes the balance of the property rights of the landowner and applicant with those of the surrounding landowners, and serves broader public purpose and interest goals of the County by providing the County with not only a long-term storage facility for waste, but also a significant tax revenue source.

(End)

Attachment 3

Solid Waste Landfills and Residential Property Values (NSWMA Research Paper)

White Paper
SOLID WASTE LANDFILLS AND RESIDENTIAL PROPERTY VALUES
By Bruce J. Parker,
President & CEO
National Solid Wastes Management Association (NSWMA)

Summary

The effects of landfills and other solid waste facilities on nearby residential properties cannot be easily generalized; however, academic research and other evidence indicate that residential property values are not necessarily adversely affected by close proximity to such facilities. In some circumstances, the impact can be positive.

State-of-the-art, environmentally safe landfills, transfer stations, and waste-to-energy facilities are able to contribute to healthy land values through host community fees, tax revenues, jobs, reliable waste disposal services, energy generation, and infrastructure improvements.

Parker cites several examples, such as a study in Texas for a planned landfill, which concluded, "Throughout the state, research at other landfills has shown no decline in property values and, in many cases, nearby property values have actually increased around well-designed and operated facilities."

Parker comments, "Generalizations and misinformation about the community impacts of these needed facilities only exacerbate the problem. The nature of this problem is aptly summarized by the First Law of Garbage, which is: 'Everybody wants it picked up, but nobody wants it put down.' And, the second part of this Law is: 'Nobody wants it put down anywhere near them.'

"NSWMA supports efforts to reduce our waste generation and to reuse and recycle as much as we can," Parker adds. "Over the past decade, states and local communities have been successfully moving in that direction. But safe, environmentally protective disposal facilities will be needed regardless of how much waste can be reduced or recycled."

Parker notes there is a "growing compatibility" between modern, highly engineered landfills and the physical and economic environments of communities. In support of this view, he points to the statement of a former official of the Illinois Environmental Protection Agency: "Landfills and communities can work together and accept each other and actually benefit from each other."

SOLID WASTE LANDFILLS AND RESIDENTIAL PROPERTY VALUES

INTRODUCTION

A recent staff paper [1]* by two Pennsylvania State University professors, "The Impact of Open Space and Potential Local Disamenities on Residential Property Values in Berks County, Pennsylvania," examined the impact of neighboring land use on residential property values in a predominantly rural county. Included in the category of land uses ("potential local disamenities") were: landfills, airports, mushroom production, large-scale animal production, sewage treatment plants, and high-traffic roads. Among the staff paper's conclusions was that the residential property values-price distance relationship was most significant for landfills and large-scale animal production facilities.

The National Solid Wastes Management Association (NSWMA) offers the following comments on the Pennsylvania State University study:

1. Other academic studies – including a 1982 Penn State study -- reach very different conclusions regarding the impact of landfills on property values. In fact, today's state-of-the-art landfills provide a variety of economic, employment and community-enhancement benefits that typically contribute to property values.

2. The staff paper's findings cannot be generalized, and should not stand for the proposition that home values automatically suffer when located near a landfill. Indeed, the authors caution against "extrapolating the results of this research" beyond the rural county studied. Thus, sweeping generalizations about the effect of a landfill or other solid wastes facilities (e.g. transfer stations, material recovery & recycling facilities, waste-to-energy plants) on a community should not be accepted as universally true.

3. It has become increasingly more difficult to site or expand modern, state-of-the-art landfills, which are fully protective of the environment and public health in compliance with federal and state laws and regulations. Generalizations and misinformation about the community impacts of these needed facilities only exacerbates the problem. The nature of this problem is aptly summarized by the First Law of Garbage, which is: "Everybody wants it picked up, but nobody wants it put down." And, the second part of this Law is: Nobody wants it put down anywhere near where they live, the so-called "not in my back yard" syndrome (NIMBY), or "locally unacceptable land use" (LULUs).

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* According to Pennsylvania State University, "staff papers are circulated without formal review of the Department of Agricultural Economics and Rural Sociology. Contents are the sole responsibility of the authors."

4. Some argue that NIMBY is acceptable, that we can reduce, reuse and recycle waste at the source to such an extent that our need for landfills will simply disappear. NSWMA supports efforts to reduce our waste generation and reuse and recycle as much as we can. Over the past decade states and local communities throughout the nation have been successfully moving in this direction. But safe, environmentally protective disposal facilities will be needed regardless of how much waste can be reduced or recycled. Modern landfills are still an important part of U.S. EPA's hierarchy of options to safely and economically manage our solid waste.

INFORMATION ON LANDFILLS AND PROPERTY VALUES

Penn State research that is inconsistent with 2003 staff paper: A 1982 study[2] by Penn State researchers sought to isolate from other variables the effect that proximity to a landfill might have on real property values, i.e., actual sales. Essentially, this study determined that there was no "conclusive" evidence that these landfills had any adverse impact on the rate of community development in surrounding areas. The researchers found that different variables, such as property characteristics, and other factors led to nearly the identical result: property characteristics other than distance to the landfill appeared much more important in explaining prices. Furthermore, the study concluded that even in those cases where distance to a disposal facility would weigh heavily in the equation, there would probably be sufficient depth to the real estate market to prevent property depreciation.

"The Town That Loves Trash": A 1992 segment of ABC's television program, 20/20, featured the community of Riverview, where an affluent residential development of over 100 homes sits across the street from one of the state's largest active landfills.[3] A scan of the new homes shows beautiful properties selling for as high as $500,000. According to the Mayor, "Garbage is good for Riverview." ABC's John Stossel, who narrates this story, reports that revenue from hosting the landfill has allowed Riverview to refurbish the firehouse, buy a new fire engine, two new ambulances, and the community has the lowest tax rate in the community. Moreover, Riverview built a 27-hole golf course around the landfill to provide quality recreation for the homeowners.

The Detroit News: Eight years after the "20/20" story on Riverview, *The Detroit News* did a feature article on Riverview,[4] pointing out that new homes across from the landfill range in price from $400,000 to $800,000. A homeowner who bought her home in 1994 for $264,000 notes that "we just had it appraised at $410,000." The article reports that in Northville Township, Michigan, "the Stonewater development boasts million-dollar homes in view of the Arbor Hills West landfill less than one mile away," and that "other states already have caught on to the value of property adjacent to landfills." For example, two landfills outside Chicago, Illinois, "added golf courses to their landfills." And in Commerce City, Colorado, a landfill was annexed by city officials "to help contribute to development" and "half-million dollar homes and millions in commercial and office development are planned just blocks from the landfill..."

Chicago Tribune: A 1994 *Chicago Tribune* article[5] reported on the growing examples of upscale residential developments being built adjacent to or in close proximity to landfills: "Amid the farmhouses, cornfields and winding roads of rural Lake County, Illinois," a 317 single family home development on 670 acres, with purchase prices from $190,000 to $300,000, is located near an 80 acre landfill.

Los Angeles – San Fernando Valley: A 1991 study[6] of the effects on neighborhood property values from a landfill concluded that the "results suggest that a landfill, if well-designed and managed, can be a good neighbor and have no statistically measurable negative impact on surrounding property values." The study analyzed 1,628 house sales in the San Fernando Valley of Los Angeles from 1978 to 1988. The target neighborhood, located adjacent to the landfill, was compared to two other neighborhoods that were similar in demographics, socioeconomic characteristics, and other factors, but were outside the area affected by the landfill.

Phoenix, Arizona: The San Fernando Valley study above and another with a similar finding, was relied on by the city of Phoenix, Arizona, in 2002, in response to potential questions regarding the effect on residential property values in conjunction with a planned landfill to be sited near the town of Buckeye, Arizona.[7] The city also said that "recent studies in Arizona reflect these findings."

Texoma Area Solid Waste Authority (TASWA): The Authority, composed of three Texas cities and two counties, advised the public that its planned state-of-the-art landfill would not result in a reduction in property values: "Throughout the state, research at other landfills has shown no decline in property values and, in many cases, nearby property values have actually increased around well-designed and operated facilities."[8] Moreover, "landfill operations, including landfill employees and vendors, will contribute significantly to the local economies which will, in turn, benefit area services including schools."

Real Estate Appraisal Review: Several unpublished articles on the impact of landfills on property values[9], suggest that landfills do not have a large impact on real estate development activities and prices. In one case, the development of a landfill required a large investment in infrastructure improvements, such as roads, utilities, drainage, etc., and an increase in value actually resulted.

Tacoma Washington: In Tacoma, Washington, the effects were studied[10] of a 200-acre landfill on 665 residential properties sold between 1983 and 1986. There were three distinct neighborhoods within this area, and the results were statistically insignificant in two of these cases. In the third neighborhood the results were statistically significant, and the landfill had a positive impact on the surrounding property values. In fact, a new development complex was built directly adjacent to the landfill.

Philadelphia Magazine: An article in 2002[11] recounted how taxes had fallen, the public infrastructure had improved, businesses had moved in, and property values had gone up in Falls Township, Bucks County, as a result of a major landfill expansion in 1995. "Falls [Township] got a deal worth ... an estimated $95 million in fees over 10 years. Falls's debt was retired by December 2000, taxes have gone down every year since, millions have been spent on parks, 50-year-old roads have been repaved, other large businesses have moved in, and, amazingly, property values have gone up, despite, perhaps even because of, the landfill," the article said.

While the above examples of high residential property values in close proximity to a landfill may not be typical and are influenced by many variables, they represent the present and growing compatibility of a modern, highly engineered landfill with its community's physical and economic environment. A former official with the Illinois Environmental Protection Agency said it best: "Landfills and communities can work together and accept each other and actually benefit from each other."[12]

In fact, communities throughout the country have embraced modern landfills as a significant business opportunity -- a source of economic stimulus, new jobs, more revenue infusion and improved civic services. The "host community" fees, property taxes, license fees and business taxes that a community receives from hosting a landfill have allowed for the elimination or substantial reduction in residential property taxes, construction of playgrounds and other recreational facilities, building new schools, hiring police and firemen, the purchase of new fire trucks and police cruisers, and making infrastructure improvements. Moreover, rather than reduce residential property values, these substantial community benefits should help to add value or, at least, reduce any marginal negative influence in the price-distance relationship of residential property to a landfill.

CONCLUSIONS:

1. Sweeping generalizations about the economic effects of a landfill on a community, one way or the other, should not be extrapolated as universally applicable. Academic research and other evidence show that residential property values are not negatively affected by close proximity to a landfill and, in some circumstances, expensive home developments are built near landfills. These studies are counter-weights to those reaching a different conclusion. Decisions relating to site selection and construction of a landfill or expansion at an existing site will depend on the circumstances of each particular case.

2. There are many examples of expensive residential developments located directly across from or in close proximity to a landfill. Landfill benefits that contribute to healthy property values include host community fees, tax revenues, job creation, reliable solid waste disposal services, energy from landfill gas, infrastructure and civic improvements.

3. Today's landfills are state-of-the-art. The U.S. EPA has promulgated regulations for municipal solid waste landfills that ensure that they are protective of human health and the environment, regardless of where they are located. Today's landfill standards include strict: location restrictions, operating requirements, groundwater and air protection requirements, monitoring requirements, and closure and post-closure care requirements.. States are free to require even more stringent rules. Today, all states have adopted rules that meet or exceed the federal regulations.

4. The site selection and construction or expansion of an existing landfill is not a quick process. Generally, it takes several years or longer from start-to-finish before a new landfill or an expansion is fully permitted and operational. Local zoning and land-use requirements also are addressed. The permitting process provides for "notice and comment," and participation by proponents and opponents of the project, as well as other stakeholders, is invited to make their views and concerns known at public hearings.

(Questions or comments to this report should be addressed to Bruce J. Parker, President & CEO, National Solid Wastes Management Association (NSWMA), (202-364-3730 / bparker@envasns.org)

REFERENCES

[1] Richard Ready and Charles Abdallah, "The Impact of Open Space and Potential Disamenities on Residential Property Values in Berks County, Pennsylvania," Pennsylvania State University, Department of Agricultural Economics and Rural Sociology, Staff Paper 363, (June 2003).

[1] Hays B. Gamble, Roger H. Downing, James S. Shortle and Donald J. Epp., "Effects of Solid Waste Disposal Sites on Community Development and Residential Property Values, Pennsylvania State University Institute for Research on Land and Water Resources, Research Dept. LW 8214, Final Report for the Pennsylvania Bureau of Solid Waste Management, Department of Environmental Resources (1982).

3 20/20, ABC Television Network (Richard Stossel, narrator), "The Town That Loves Trash," (January 10, 1992).

4 Steve Pardo, "Pricey houses Downriver came with view -- of landfill," *The Detroit News*, (September 25, 2000).

5 Steve Mills, "Upscale homes popping up near landfills," *Chicago Tribune,* Metro Section, (September 4, 1994).

[6] Donald H. Bleich, PhD, M. Chapman Findley III, PhD, and G. Michael Phillips, PhD, "An Evaluation of the Impact of a Well-Designed Landfill on Surrounding Property Values," The Appraisal Journal, pp. 247 – 52 (April, 1991).

[7] City of Phoenix, "SR 85 Landfill Site Fact Sheet, (September 2002/Revised September 26, 2002).

[8] Texoma Area Solid Waste Authority, All About TASWA, Facts and Questions (FAQ's) http://www.taswa.com/allabout.htm, (2002).

[9] C. Cartee, "A Review of Sanitary Landfill Impacts on Property Values," Real Estate Appraiser and Analyst, pp. 43-47 (Spring 1989).

[10] Chris Zeiss and James Atwater, "Waste Facility Impacts on Residential Property Values," Journal of Urban Planning and Development, 115, pp. 64-80 (September 1989).

[11] Ivan Solotaroff, "Trashville," *Philadelphia Magazine*, December 2002.

[12] Steve Mills, *Chicago Tribune*, supra, footnote 5.

Attachment 4

Engineer's Geotechnical Opinion Letter

BP Barber
Engineering • Experience • Excellence

August 12, 2009

Mr. Daniel R. Moore
Environmental Manager
MRR Sandhills, LLC
2005 Rolling Road
Greensboro, NC 27403

Re: MRR Sandhills, LLC
Municipal Solid Waste Landfill
Marlboro County
Letter of Opinion of Geotechnical Suitability

Mr. Moore:

This is a Letter of Opinion of Geotechnical Suitability for the above mentioned site in compliance with the requirements of the Marlboro County Zoning Ordinance Sections 5-4, Item 2. The site is generally located along the South Carolina - North Carolina state line with potential access from SC Highway 177 (see attached location map). The site consists of approximately 1,050 acres located in the Upper Coastal Plain.

Preliminary geotechnical investigation indicates that groundwater is generally located twenty (20) to twenty-five (25) feet below the surface and bedrock is in excess of forty-five (45) feet below the surface.

The design concept of a Class Three landfill consists of restricting leachate seepage into the groundwater aquifer so as to minimize groundwater degradation. To satisfy these design criteria, a composite lined landfill (Class Three Landfill) consisting of clay and a synthetic membrane and a leachate collection system is required. This design concept reduces the likelihood of leakage to the groundwater is negligible. Therefore, the likelihood of the surrounding groundwater sources be contaminated is negligible.

The estimated deflected (or settled) bottom elevation of a Class Three Landfill base grade shall be a minimum of three (3) feet above seasonal high water table elevation as it exist prior to the construction of the disposal area according to South Carolina Department of Health and Environmental Control Regulation 61-107.19. Based on the abovementioned preliminary geotechnical investigation the groundwater elevation is above any know bedrock and therefore the waste will be contained by the composite lined landfill consisting of clay and a synthetic membrane and a leachate collection system not bedrock.

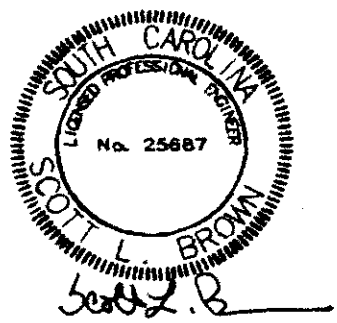
Based on the above discussion it is my professional opinion that likelihood of the surrounding groundwater sources be contaminated is negligible.

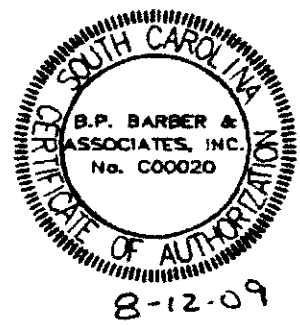
Please let me know if you have any questions or comments.

Sincerely,

BP Barber

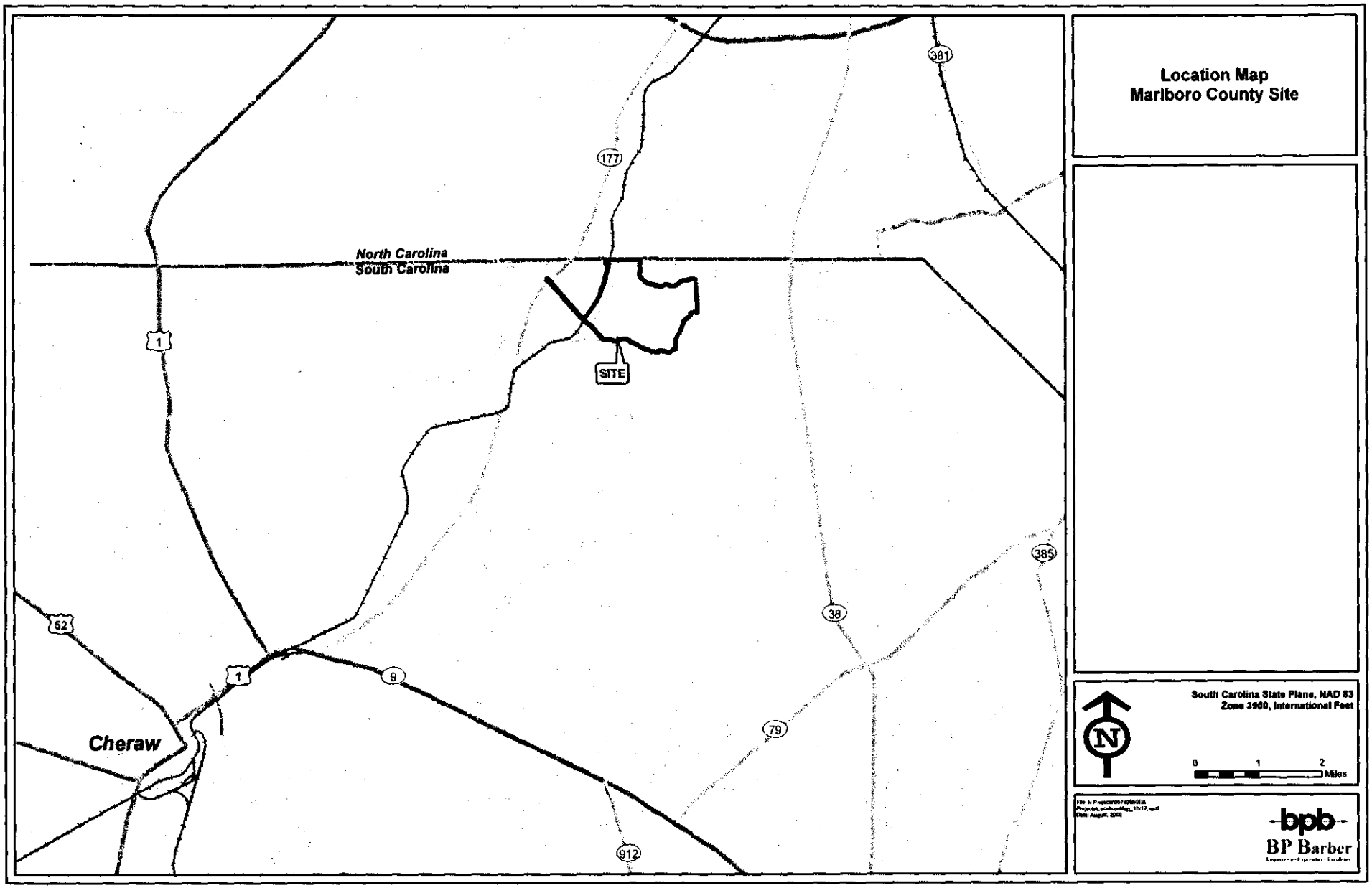
Scott L. Brown, PE
Regional Office Manager





Reference: Bagghi, Amalendu (2004). *Design of Landfills and Integrated Solid waste Management*. New Jersey: John Wiley & Sons, Inc.

Attachment


Location Map
Marlboro County Site
North Carolina
South Carolina
SITE
Cheraw
381
177
1
52
9
79
38
385
912
South Carolina State Plane, NAD 83
Zone 3900, International Feet
N
0
1
2
Miles
bpb
BP Barber

Attachment 5

Drainage and Sedimentation Plan

Drainage and Sedimentation Plan
MRR Sandhills, LLC Class Three Landfill
Marlboro County, SC

August 26, 2009

1.0 Introduction and Overview

Section 5-4 of the Marlboro County Zoning Ordinance[1] states that "A drainage and sedimentation plan shall accompany the request, showing all off-site runoff (applies to landfills only)." This document was prepared to address the referenced ordinance.

This Drainage and Sedimentation Plan (hereafter referred to as the "Plan") for MRR Sandhills, LLC (MRR) Class Three Landfill is based upon the existing South Carolina stormwater management regulations and supporting information that applicants need to proceed through the land disturbance permitting process. This Plan provides the general guidance and procedures that MRR will follow in obtaining a permit from DHEC for siting and operation of the landfill as well as an NPDES Stormwater Management and Sediment Control Permit, both of which will be required upon finalizing all site studies and detailed engineering and design for the facility.

By DHEC regulation, construction cannot be initiated at the MRR site before the above permits have been issued. While it is not practicable to obtain the final permits prior to performing detailed topographic mapping, extensive subsurface geotechnical investigations, and analysis of the data for detailed design engineering, it is possible to provide the procedures and assurances that the landfill project will not have deleterious effects upon human health and the environment as it relates to drainage and sedimentation. This Plan provides those assurances. Much of the information and guidance in the Plan was obtained directly from the South Carolina Stormwater

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[1] Marlboro County Zoning Ordinance, Ordinance No. 545, dated 2002, obtained from: http://www.marlborocounty.sc.gov/NR/rdonlyres/DA3AB425-8046-4FCC-A17E-A501D67A9582/0/Zoning.pdf

Management and Sediment Control Handbook for Land Disturbance Activities[2]. This document is a compilation of existing South Carolina stormwater management regulations and supporting information that MRR will need to proceed through the land disturbance permitting process for their facility.

The Marlboro County Zoning Ordinance referenced above specifically states that the Drainage and Sedimentation Plan must show all off-site runoff. We have shown on the Site Plan contained herein the approximate location of a stormwater basin which will serve as the initial stormwater control device. Stormwater from construction activities will be directed into this basin. Stormwater will flow from this basin and future basins (if required) to an unnamed tributary immediately west of the basin then flow south into another small unnamed tributary where it flows off site merging into White's Creek.

2.0 Plan Objective

The objective of this Plan is to create a comprehensive reference for Marlboro County and MRR, prior to submitting final stormwater management and sediment reduction permit applications for approval to the Department of Health and Environmental Control (DHEC). This Plan summarizes the application process and sets forth the minimum standards and design specifications for land disturbing activities that require stormwater permits. The supporting information in the Plan includes sediment control design aides and other useful information. This document references pertinent sections from the S. C. Stormwater Management and Sediment Reduction regulations, and the NPDES General Permit for Stormwater Discharges from Construction Activities which are included as appendices.

3.0 South Carolina Stormwater Management and Sediment Reduction Regulations

A stormwater management plan in compliance with the requirements of existing regulations must be submitted for MRR's proposed project. Appendix A to this Plan contains a copy of the S. C. Stormwater Management and Sediment Reduction regulations. The stormwater permitting program for Marlboro County is implemented by DHEC's Bureau of Water, which now includes parts of the former Land Resources Conservation Commission.

The MRR project falls within DHEC's category of activities involving more than two (2) acres of actual land disturbance, which furthermore is not part of a larger common plan of development or sale. The requirements of DHEC Regulation R.72-305 and R.72-307 from Appendix A and the requirements of the NPDES General Permit SCR100000 thus

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[2] South Carolina Stormwater Management and Sediment Control Handbook for Land Disturbance Activities, August 2003, South Carolina Department of Health and Environmental Control, Environmental Quality Control, Bureau of Water, Office of Ocean and Coastal Resource Management, revised 08/03

apply to this project. Plans and specifications for the proposed landfill site activities will be prepared by professional engineers, geologists, and land surveyors.

4.0 DHEC Stormwater Management Plan Submittal

MRR will do a preliminary analysis to determine which of the different categories the landfill project will fall under. We will then submit the appropriate application form required by DHEC and all information required for the submittal. The initial submittal package will include only one (1) paper copy of the stormwater management and sediment reduction plans and corresponding calculations. After the plans have been reviewed to determine compliance with the regulations, the DHEC plan reviewer will contact MRR's project engineer and request necessary changes, if applicable, or notify the representative that the plans are in compliance.

When the plans have been determined to be in compliance then MRR will send four (4) additional paper copies for stamped approval. One copy of the plan is for the project engineer, one is for MRR, one is for the grading/construction contractor and must be available onsite at all times, and one copy is for the DHEC inspector.

5.0 NPDES General Permit Application

All landfill construction projects such as that proposed by MRR, disturbing one (1) acre or greater must obtain either NPDES general permit coverage or an individual NPDES permit depending upon the type and extent of disturbance. NPDES General Permit coverage under SCR100000 will be obtained by the above referenced submittal information including the applicable application form, plans and specifications. We anticipate that the application form will serve as the Notice of Intent (NOI) for NPDES general permit coverage for our construction activities.

6.0 Notification of Initiation of Land Disturbance Activity

MRR will notify the appropriate DHEC plan review office with copies of the notification being sent to the local DHEC Pee Dee Region District Office in Florence, SC prior to initiation of the land disturbing, landfill construction activity. Prior to completion of the landfill project, a final inspection will be requested from the District Office.

7.0 MRR Landfill Design Guidelines for Sediment and Erosion Control

In the event that MRR's project involves construction and grading activities which disturb ten (10) acres or more, we will comply with DHEC's stormwater management regulations which require that, when stormwater runoff drains to a single outlet from land disturbing activities which disturb ten (10) acres or more, then a sediment basin must be designed to meet a removal efficiency of 80 percent for suspended solids or 0.5 ML/L peak settleable concentration, whichever is less. The efficiency will be calculated

for disturbed conditions at the MRR site for the 10-year 24-hour design event. Appendix B contains a report titled "Engineering Aids and Design Guidelines for Control of Sediment in South Carolina" which will be utilized and referenced when calculating sediment removal efficiencies for the MRR landfill project.

In the event that our final design involves activities that have between five (5) and ten (10) acres of land disturbance area draining to a single outlet, we may incorporate other practices besides a sediment basin to achieve the equivalent removal efficiency of 80 percent for suspended solids or 0.5 ML/L peak settleable solids concentration. Specific site conditions and/or topography may eliminate the need for removal efficiency calculations. Construction activities that disturb less than five (5) acres do not require sediment calculations but the design of these projects must include sediment control best management practices during construction.

8.0 Project Inspections

In addition to MRR's routine construction and operations inspections related to sedimentation and drainage, DHEC staff will conduct periodic site inspections on all land disturbing activities. MRR will notify the DHEC Pee Dee Region District Office before initiation of construction events and upon project completion, when a final inspection will be conducted to ensure compliance with the approved stormwater management and sediment control plan for the landfill. It is DHEC's policy during inspections to do all of the following items:

- Ensure that the approved stormwater management and sediment control plans for MRR are on the project site and are complied with;
- Ensure that every land disturbing activity is inspected for compliance with the approved plan on a regular basis;
- Provide MRR with a written report after every inspection;
- Notify MRR's representative responsible for the land disturbing activity in writing when violations are observed, describing the:
    - Nature of the violation;
    - Required corrective action; and
    - Time period for violation correction.

9.0 Violations and Enforcement

MRR is subject to enforcement for violations of the stormwater regulations if they are not in compliance with their issued permits. Violations will occur when (a) a site with an approved stormwater permit is not in compliance with the issued permit; or (b) a land disturbing activity is underway and MRR has not acquired the necessary permit. Enforcement procedures will vary according to the severity of the violation but might include DHEC imposing fines or issuing cease and desist orders. Violations of the S. C. Pollution

Control Act as prescribed by SCR100000 may subject MRR to a civil penalty of up to $10,000 per violation per day. Additional information on enforcement procedures is contained in Section 72-312 of Appendix A.

10.0 MRR's Best Management Practices (BMPs)

Appendix C to this Plan contains a table of some of the stormwater management and sediment reduction best management practices (BMPs) used in South Carolina. The existing conditions at the MRR site, determined from site surveys, will aid in selecting the most effective BMPs to use when preparing final detailed engineering and landfill design plans for permit submittal.

(End)

Appendix A

South Carolina Stormwater Management and Sediment Reduction Regulations

APPENDIX A

S. C. STORMWATER MANAGEMENT AND SEDIMENT REDUCTION REGULATIONS

FINAL REGULATIONS

LAND RESOURCES CONSERVATION COMMISSION

CHAPTER 72

Statutory Authority: 1976 Code, Title 48, Chapter 14

72-300 Standards for Stormwater Management and Sediment Reduction

Synopsis:

These proposed regulations pursuant to the Stormwater Management and Sediment Reduction Act of 1991 establish the procedure and minimum standards for a statewide uniform program for stormwater management and sediment reduction with the option of being operated locally. The regulations establish the procedure for local governments or conservation districts to apply for program component delegation. They also establish the criteria to be met for delegation. Minimum standards and specifications are established for land disturbing activities that require a permit.

The proposed regulations encourage management of stormwater and sediment on a watershed basis. Criteria and procedures are established for designating watersheds and creating stormwater utilities.

When the law becomes effective, it will be implemented in a phased approach as listed in the regulations.

Instructions:

New regulations added.

Text:

72-300. Scope.

72-301. Definitions.

72-302. Exemptions, Waivers and Variances from Law.

72-303. Commission Responsibilities.

72-304. Criteria for Delegation/Revocation of Programs.

72-305. Permit Application and Approval Process.

72-306. Fees.

72-307. Specific Design Criteria, Minimum Standards and Specifications.

72-308. Maintenance Requirements and Off-Site Damage Correction.

72-309. Criteria for Designated Watersheds.

72-310. Criteria for Implementation of a Stormwater Utility.

72-311. Plan Review and Inspector Certification Program.

72-312. Review and Enforcement Requirements.

72-313. Hearings and Hearings Procedures.

72-314. Citizen Complaint Procedure on Delegated Program Components and Individual Sites.

72-315. Penalties.

72-316. Severability.

72-300. Scope.

A. Stormwater runoff is a source of pollution of waters of the State, and may add to existing flooding problems. The implementation of a statewide stormwater management and sediment control program will help prevent additional water quantity and quality problems and may reduce existing problems.

B. Stormwater management and sediment control plan approvals are necessary prior to engaging in any land disturbing activity related to residential, commercial, industrial or institutional land use which are not specifically exempted or waived by these regulations.

C. To the extent possible, the Commission intends to delegate the provisions of these regulations to local governments. Those program provisions which are subject to delegation include stormwater management and sediment control plan approval, construction and maintenance inspections, enforcement, and education and training.

D. The Commission encourages the implementation of the Stormwater Management and Sediment Reduction Act on a watershed basis by local governments. The Commission recognizes that all jurisdictions may not have the resources available to implement this type of program immediately. However, the comprehensive approach of implementing the program on the watershed basis will allow for planned, orderly development in a watershed.

E. The implementation of a stormwater utility represents a comprehensive approach to program funding and implementation. The activities which may be undertaken by a stormwater utility include not only assessment, collection, and funding activities, but also carrying out provisions of adopted stormwater management plans. These provisions may include contracting for such services as project construction, project maintenance, project inspection, and enforcement of installation and maintenance requirements imposed with respect to approved land disturbing activities.

72-301. Definitions.

As used in these regulations, the following terms shall have the meanings indicated below:

1. "Adverse Impact" means a significant negative impact to land, water and associated resources resulting from a land disturbing activity. The negative impact includes increased risk of flooding; degradation of water quality; increased sedimentation; reduced groundwater recharge; negative impacts on aquatic organisms; negative impacts on wildlife and other resources; and threatened public health.

2. "Applicant" means a person, firm, or governmental agency who executes the necessary forms to obtain approval or a permit for a land disturbing activity.

3. "Appropriate Plan Approval Agency" means the Commission, Local Government, or Conservation District that is responsible in a jurisdiction for review and approval of stormwater management and sediment control plans.

4. "As-Built Plans or Record Documents" means a set of engineering or site drawings that delineate the specific permitted stormwater management facility as actually constructed.

5. "Best Management Practices" means a wide range of management procedures, schedules of activities, prohibitions on practices and other management practices which have been demonstrated to effectively control the quality and/or quantity of stormwater runoff and which are compatible with the planned land use.

6. "Certified Construction Inspector" means a person with the responsibility for conducting inspections during construction and maintenance inspections after the land disturbing activity is completed as certified by the Commission.

7. "Certified Plan Reviewer" means a person with the responsibility for reviewing stormwater management and sediment control plans for an appropriate plan approval agency as certified by the Commission.

8. "Commission" means the South Carolina Land Resources Conservation Commission.

9. "Delegation" means the acceptance of responsibility by a Local Government or Conservation District for the implementation of one or more elements of the statewide stormwater management and sediment control program.

10. "Designated Watershed" means a watershed designated by a local government and approved by the Commission, Department of Health and Environmental Control and the South Carolina Water Resources Commission and identified as having an existing or potential stormwater, sediment control, or nonpoint source pollution problem.

11. "Detention Structure" means a permanent stormwater management structure whose primary purpose is to temporarily store stormwater runoff and release the stored runoff at controlled rates.

12. "Develop Land" means to change the runoff characteristics of a parcel of land in conjunction with residential, commercial, industrial, or institutional construction or alteration.

13. "Developer" means a person undertaking, or for whose benefit, activities covered by these regulations are commenced and/or carried out.

14. "District" means any soil and water conservation district created pursuant to Chapter 9, Title 48, S.C. Code of Laws.

15. "Drainage Area" means that area contributing runoff to a single point.

16. "Easement" means a grant or reservation by the owner of land for the use of such land by others for a specific purpose or purposes, and which must be included in the conveyance of land affected by such easement.

17. "Erosion" means the wearing away of land surface by the action of wind, water, gravity, ice, or any combination of those forces.

18. "Erosion and Sediment Control" means the control of solid material, both mineral and organic, during a land disturbing activity to prevent its transport out of the disturbed area by means of air, water, gravity, or ice.

19. "Exemption" means those land disturbing activities that are not subject to the sediment and stormwater requirements contained in these regulations.

20. "Grading" means excavating, filling (including hydraulic fill) or stockpiling of earth material, or any combination thereof, including the land in its excavated or filled condition.

21. "Implementing Agency" means the Commission, local government, or conservation district with the responsibility for receiving stormwater management and sediment control plans for review and approval, reviewing plans, issuing permits for land disturbing activities, or conducting inspections and enforcement actions in a specified jurisdiction.

22. "Infiltration" means the passage or movement of water through the soil profile.

23. "Land Disturbing Activity" means any use of the land by any person that results in a change in the natural cover or topography that may cause erosion and contribute to sediment and alter the quality and quantity of stormwater runoff.

24. "Natural Waterways" means waterways that are part of the natural topography. They usually maintain a continuous or seasonal flow during the year and are characterized as being irregular in cross-section with a meandering course. Construction channels such as drainage ditches shall not be considered natural waterways.

25. "Nonerodible" means a material, e.g., natural rock, riprap, concrete, plastic, etc., that will not experience surface wear due to natural forces of wind, water, ice, gravity or a combination of those forces.

26. "Local Government" means any county, municipality, or any combination of counties or

municipalities, acting through a joint program pursuant to the provisions of this chapter.

27. "Nonpoint Source Pollution" means pollution contained in stormwater runoff from ill-defined, diffuse sources.

28. "One Hundred Year Frequency Storm" means a storm that is capable of producing rainfall expected to be equaled or exceeded on the average of once in 100 years. It also may be expressed as an exceedence probability with a 1 percent chance of being equaled or exceeded in any given year.

29. "Person" means any State or federal agency, individual, partnership, firm, association, joint venture, public or private corporation, trust, estate, commission, board, public or private institution, utility, cooperative, municipality or other political subdivision of this State, any interstate body or any other legal entity.

30. "Person Responsible for the Land Disturbing Activity" means
    (a) the person who has or represents having financial or operational control over the land disturbing activity; and/or
    (b) the landowner or person in possession or control of the land who directly or indirectly allowed the land disturbing activity or has benefitted from it or who has failed to comply with any provision of the act, these regulations, or any order or local ordinance adopted pursuant to this act as imposes a duty upon him.

31. "Post-Development" means the conditions which exist following the completion of the land disturbing activity in terms of topography, vegetation, land use and rate, volume or direction stormwater runoff.

32. "Pre-Development" means the conditions which existed prior to the initiation of the land disturbing activity in terms of topography, vegetation, land use and rate, volume or direction of stormwater runoff.

33. "Redevelopment" means a land disturbance activity that alters the current use of the land but does not necessarily alter the pre-development runoff characteristics.

34. "Responsible Personnel" means any foreman, superintendent, or similar individual who is the on-site person in charge of land disturbing activities.

35. "Retention Structure" means a permanent structure whose primary purpose is to permanently store a given volume of stormwater runoff. Release of the given volume is by infiltration and/or evaporation.

36. "Sediment" means solid particulate matter, both mineral and organic, that has been or is being transported by water, air, ice, or gravity from its site of origin.

37. "Single Family Residence-Separately Built" means a noncommercial dwelling that is occupied exclusively by one family and not part of a residential subdivision development.

38. "Stabilization" means the installation of vegetative or structural measures to establish a soil cover to reduce soil erosion by stormwater runoff, wind, ice and gravity.

39. "Stop Work Order" means an order directing the person responsible for the land disturbing activity to cease and desist all or any portion of the work which violates the provisions of this act.

40. "Stormwater Management" means, for:
    (a) quantitative control, a system of vegetative or structural measures, or both, that control the increased volume and rate of stormwater runoff caused by manmade changes to the land;
    (b) qualitative control, a system of vegetative, structural, or other measures that reduce or eliminate pollutants that might otherwise be carried by stormwater runoff.

41. "Stormwater Management and Sediment Control Plan" means a set of drawings, other documents, and supporting calculations submitted by a person as a prerequisite to obtaining a permit to undertake a land disturbing activity, which contains all of the information and specifications required by an implementing agency.

42. "Stormwater Runoff" means direct response of a watershed to precipitation and includes the surface

and subsurface runoff that enters a ditch, stream, storm sewer or other concentrated flow during and following the precipitation.

43. "Stormwater Utility" means an administrative organization that has been created for the purposes of planning, designing, constructing, and maintaining stormwater management, sediment control and flood control programs and projects.

44. "Subdivision", unless otherwise defined in an ordinance adopted by a local government pursuant to Section 6-7-1010, means all divisions of a tract or parcel of land into two or more lots, building sites, or other divisions, or parcels less than five acres, for the purpose, whether immediate or future, of sale, legacy, or building development, or includes all division of land involving a new street or a change in existing streets, and includes resubdivision and, where appropriate, in the context, shall relate to the process of subdividing or to the land or area subdivided.

45. "Swale" means a structural measure with a lining of grass, riprap or other materials which can function as a detention structure and convey stormwater runoff without causing erosion.

46. "Ten-Year Frequency Storm" means a storm that is capable of producing rainfall expected to be equaled or exceeded on the average of once in 10 years. It may also be expressed as an exceedence probability with a 10 percent chance of being equaled or exceeded in any given year.

47. "Twenty-Five Year Frequency Storm" means a storm that is capable of producing rainfall expected to be equaled or exceeded on the average of once in 25 years. It also may be expressed as an exceedence probability with a 4 percent chance of being equaled or exceeded in any given year.

48. "Two-Year Frequency Storm" means a storm that is capable of producing rainfall expected to be equaled or exceeded on the average of once in two years. It may also be expressed as an exceedence probability with a 50 percent chance of being equaled or exceeded in any given year.

49. "Variance" means the modification of the minimum sediment and stormwater management requirements for specific circumstances where strict adherence of the requirements would result in unnecessary hardship and not fulfill the intent of these regulations.

50. "Waiver" means the relinquishment from sediment and stormwater management requirements by the appropriate plan approval authority for a specific land disturbing activity on a case-by-case review basis.

51. "Water Quality" means those characteristics of stormwater runoff from a land disturbing activity that relate to the physical, chemical, biological, or radiological integrity of water.

52. "Water Quantity" means those characteristics of stormwater runoff that relate to the rate and volume of the stormwater runoff to downstream areas resulting from land disturbing activities.

53. "Watershed" means the drainage area contributing stormwater runoff to a single point.

54. "Watershed Master Plan" means a plan for a designated watershed that analyzes the impact of existing and future land uses and land disturbing activities in the entire watershed and includes strategies to reduce nonpoint source pollution, to manage stormwater runoff and control flooding. The plan must be developed for the entire watershed, regardless of political boundaries, and must include appropriate physical, institutional, economic and administrative data needed to justify the plan.

72-302. Exemptions, Waivers, and Variances From Law.

A. The following activities are exempt from both the sediment control and stormwater management requirements established by these regulations:

(1) Land disturbing activities on agricultural land for production of plants and animals useful to man, including but not limited to: forages and sod crops, grains and feed crops, tobacco, cotton, and peanuts; dairy animals and dairy products; poultry and poultry products; livestock, including beef

cattle, sheep, swine, horses, ponies, mules, or goats, including the breeding and grazing of these animals; bees; fur animals and aquaculture, except that the construction of an agricultural structure of one or more acres, such as broiler houses, machine sheds, repair shops and other major buildings and which require the issuance of a building permit shall require the submittal and approval of a stormwater management and sediment control plan prior to the start of the land disturbing activity.

(2) Land disturbing activities undertaken on forest land for the production and harvesting of timber and timber products.

(3) Activities undertaken by persons who are otherwise regulated by the provisions of Chapter 20 of Title 48, the South Carolina Mining Act.

(4) Construction or improvement of single family residences or their accessory buildings which are separately built and not part of multiple construction in a subdivision development.

(5) Land disturbing activities, other than activities identified in R.72-302A(6), that are conducted under another state or federal environmental permitting, licensing, or certification program where the state or federal environmental permit, license, or certification is conditioned on compliance with the minimum standards and criteria developed under this act.

(6) Any of the following land disturbing activities undertaken by any person who provides gas, electrification, or communications services, subject to the jurisdiction of the South Carolina Public Service Commission, or corporations organized and operating pursuant to Section 33-49-10 et seq.:

(a) land disturbing activities conducted pursuant to a certificate of environmental compatibility and public convenience and necessity issued pursuant to Title 58, Chapter 33, of the South Carolina Code, or land disturbing activities conducted pursuant to any other certification or authorization issued by the Public Service Commission;

(b) land disturbing activities conducted pursuant to a federal environmental permit, including Section 404 of the Federal Clean Water Act, and including permits issued by the Federal Energy Regulatory Commission;

(c) land disturbing activities associated with emergency maintenance or construction of electric, gas, or communications facilities, when necessary to restore service or when the Governor declares the area to have sustained a disaster and the actions are undertaken to protect the public from a threat to health or safety;

(d) land disturbing activities associated with routine maintenance and/or repair of electric, gas, or communications lines;

(e) land disturbing activities associated with the placement of poles for overhead distribution or transmission of electric energy or of communications services;

(f) land disturbing activities associated with placement of underground lines for distribution or transmission of electric energy or of gas or communications services; or

(g) land disturbing activities conducted by a person filing environmental reports, assessments or impact statements with the United States Department of Agriculture, Rural Electrification Administration in regard to a project.

Any person, other than a person identified in R.72-302A(6)(g) who undertakes land disturbing activities described in R.72-302A(6)(d,e,f) must file with the South Carolina Public Service Commission, in a Policy and Procedures Manual, the procedures it will follow in conducting such activities. Any person, other than a person identified in R.72-302A(6)(g), who conducts land disturbing activities described in R.72-302A(6)(b), must address the procedures it will follow in conducting the activities in the Policy and Procedures Manual filed with the South Carolina Public Service Commission to the extent that the land disturbing activities are not specifically addressed in the federal permit or permitting process. If any person, other than a person identified in R.72-302A(6)(g), does not have a Policy and Procedures Manual on file with the Public Service Commission, such manual must be filed with the Public Service Commission not later than six months after the effective date of Chapter 14, Title 48 of the 1976 Code of Laws, South Carolina.

Any person who undertakes land disturbing activities described in R.72-302A(6)(g) of this subsection shall give the same written notice to the commission as given to agencies whose permits are required for project approval by the regulations of the United States Department of Agriculture, Rural Electrification Administration.

(7) Activities relating to the routine maintenance and/or repair or rebuilding of the tracks, rights-of-way, bridges, communication facilities and other related structures and facilities of a railroad company.
(8) Activities undertaken on state-owned or managed lands that are otherwise regulated by the provisions of Chapter 18 of this title, the Erosion and Sediment Reduction Act.
(9) Activities undertaken by local governments or special purpose or public service districts relating to the repair and maintenance of existing facilities and structures.

B. Implementing agencies with responsibility for plan review and approval may grant waivers from the stormwater management requirements of these regulations for individual land disturbing activities provided that a written request is submitted by the applicant containing descriptions, drawings, and any other information that is necessary to evaluate the proposed land disturbing activity. A separate written waiver request shall be required if there are subsequent additions, extensions, or modifications which would alter the approved stormwater runoff characteristics to a land disturbing activity receiving a waiver.

(1) A project may be eligible for a waiver of stormwater management for both quantitative and qualitative control if the applicant can demonstrate that the proposed project will return the disturbed area to a pre-development runoff condition and the pre-development land use is unchanged at the conclusion of the project.
(2) A project may be eligible for a waiver or variance of stormwater management for water quantity control if the applicant can demonstrate that:
(a) The proposed project will have no significant adverse impact on the receiving natural waterway or downstream properties; or
(b) The imposition of peak control requirements for rates of stormwater runoff would aggravate downstream flooding.
(3) The implementing agency will conduct its review of the request for waiver within 10 working days. Failure of the implementing agency to act by end of the tenth working day will result in the automatic approval of the waiver.

C. The implementing agency with responsibility for plan review and approval may grant a written variance from any requirement of these regulations if there are exceptional circumstances applicable to the site such that strict adherence to the provisions of these regulations will result in unnecessary hardship and not fulfill the intent of these regulations. A written request for variance shall be provided to the plan approval agency and shall state the specific variances sought and the reasons with supporting data for their granting. The plan approval agency shall not grant a variance unless and until sufficient specific reasons justifying the variance are provided by the applicant. The implementing agency will conduct its review of the request for variance within 10 working days. Failure of the implementing agency to act by the end of the tenth working day will result in the automatic approval of the variance.

72-303. Commission Responsibilities.

A. The Commission is responsible for the implementation and supervision of the stormwater management and sediment control program which is established by Chapter 14, Title 48, S.C. Code.

B. The schedule for implementing the Stormwater Management and Sediment Control Act (48-14-10, et. seq.) has been established by the Commission as follows:

(1) These regulations are effective and applicable to all land disturbing activities of five acres and greater on October 1, 1992 regardless of program status at the local level. Local governments with existing local programs as of this date shall require that persons responsible for land disturbing activities on sites with disturbed areas of five acres or greater comply with these regulations. Local governments may request assistance from the Commission to implement these regulations on these sites. If a local government does not have a local program on October 1,

1992, the Commission and others shall function as the implementing agencies.

(2) FY 1992-1993:
Greenville, Charleston, Richland, Spartanburg, Lexington, Anderson, Horry, York, Berkeley, Aiken, Florence, Sumter, Pickens, Beaufort, Orangeburg

(3) FY 1993-1994:
Dorchester, Darlington, Greenwood, Laurens, Oconee, Lancaster, Georgetown, Cherokee, Kershaw, Chesterfield, Williamsburg, Colleton, Marion, Newberry, Chester, Union

(4) FY 1994-1995:
Marlboro, Dillon, Clarendon, Abbeville, Fairfield, Barnwell, Lee, Edgefield, Hampton, Bamberg, Saluda, Jasper, Calhoun, Allendale, M°Cormick

C. This schedule may be modified by the Commission due to requests from local governments to develop and implement a program prior to the scheduled implementation date. The Commission may also modify this schedule due to personnel or financial resource limitations.

D. Local governments which adopted stormwater management and/or sediment control programs prior to the effective date of these regulations may continue to administer the existing program until the scheduled implementation date for the local government.

72-304. Criteria for Delegation/Revocation of Program Elements.

A. The Commission may delegate the following components of stormwater management and sediment control programs to local governments or conservation districts as follows:

(1) Stormwater management and sediment control plan review and approval/disapproval.
(2) Inspections during construction and maintenance inspections.
(3) Enforcement.
(4) Education and training.

B. The Commission shall grant delegation of one or more program elements to any local government or conservation district seeking delegation that is found capable and meets all of the criteria set forth herein for delegation to comply with Chapter 48, Title 14, 1976 Code and these regulations.

C. Request for delegation of more than one program element may be accomplished by the submission of one request for all the elements requested. A rejection by the Commission of one element will not jeopardize delegation of other requested program elements.

D. To be considered capable of providing compliance with Chapter 14 and these regulations, applications for delegation of program elements shall contain the following requisite items:

(1) Requests for delegation of stormwater management and sediment control plan review and approval responsibility shall include the following information:
(a) Copy of enacted ordinance or program information detailing the plan approval process,
(b) Plan review check lists and plan submission requirements,
(c) Stormwater management and sediment control criteria, including waiver and variance procedures, that meet minimum standards established by these regulations,
(d) Description of personnel allocations including qualifications and experience of personnel, description of computer hardware and software resources and expected time frames for plan review which meet the requirements of R.72-305B(2) and R.72-305M, and
(e) Name of the Certified Plan Reviewer.

(2) Requests for delegation of inspection during construction and of maintenance inspection responsibility shall include the following information:
(a) Inspection and referral procedures,
(b) Time frames for inspection of active land disturbing activities,
(c) Time frames for inspection of completed stormwater management structures,
(d) Inspection forms,
(e) Description of adequate personnel allocations including qualifications and experience of

personnel,

(f) Name of Certified Construction Inspector, and

(g) Procedures and time frames for processing complaints.

(3) Request for delegation of enforcement responsibility shall include the following information:

(a) Procedure for processing violations.

(b) Description of personnel allocations involved in enforcement actions including qualifications and experience of personnel.

(c) Description of citizen complaint process.

(d) Description of applicant appeal process.

(4) Requests for delegation of education and training responsibility shall include the following information:

(a) Types of educational and training activities to be accomplished,

(b) Frequency of activities,

(c) Names and backgrounds of those individuals conducting the training, and

(d) Procedures and timetables to notify the Commission of educational programs.

E. Requests for delegation of program elements must be submitted by local governments or conservation districts within six months of the effective date of these regulations, and by January first of subsequent years if delegation is desired at a future date. The Commission shall approve, approve with modification, or deny such a request on or before April first of the year for which delegation is sought.

F. The S.C. Coastal Council shall assist the Commission in reviewing all requests for delegation of program elements from local governments in the counties of Beaufort, Berkeley, Charleston, Colleton, Dorchester, Georgetown, Jasper and Horry to ensure that the delegated program elements are consistent with the Coastal Zone Management Program.

The S.C. Coastal Council, in coordination with the Commission, will serve as the implementing agency for these regulations in the jurisdictions of the local governments which do not seek delegation of program elements in the counties of Beaufort, Berkeley, Charleston, Colleton, Dorchester, Georgetown, Horry and Jasper.

G. If the Commission denies a request for delegation, the local government or conservation district may appeal the decision of the Commission by requesting an administrative hearing within 30 days after receipt of written notification as described in R.72-313.

H. Delegation of authority for one or more program elements may be granted for a maximum time frame of three years. After three years a new application to the Commission must be made. Over the time frame for which delegation has been granted, the Commission will evaluate delegation implementation, coordinate review findings with the delegated authority, and determine if the new delegation should be granted.

I. A delegated authority may sub-delegate program elements, with Commission concurrence, to a conservation district, regional council of government or other responsible entity or agency.

J. The Commission shall maintain, and make available upon request, a listing of the current status of delegation for all jurisdictions within the State.

K. Any local government that has adopted a stormwater management and/or sediment control program prior to the effective date of these regulations may request approval of any, or all, components of its existing program within six months of the effective date of these regulations. The Commission shall give priority to the approval, approval with modification or disapproval of these requests. The local government shall continue to administer the existing program during the review process by the Commission. Efficiency and effectiveness of the existing program shall be considered in the review process.

(1) The Commission shall approve a delegation request upon determining that the implementation of the existing program by the local government equal or exceed the requirements, criteria, standards and specifications of these regulations.

(2) If the request for delegation of program components are disapproved, the local government may

appeal the decision of the Commission by requesting an administrative hearing within 30 days after receiving written notification of the disapproval as described in R.72-313.

L. If the Commission determines that a delegated program falls below acceptable standards established by these regulations, delegation may be suspended. During a period of suspension, the Commission shall be responsible for implementation of the program element. The Commission shall collect fees based on R.72-306 for use when the delegation is suspended.

The following actions may be cause for suspension if they represent a continuing pattern of action or in-action:

(1) Failure of implementing agency with the responsibility for enforcement to issue a violation in the event of off-site sediment or stormwater damage resulting from non-compliance with the approved plan.
(2) Failure of the implementing agency to assess a fine when a violation has not been corrected within the specified time frame.
(3) Failure of the implementing agency to stop work when a violation has resulted in off-site damages.
(4) Failure of the implementing agency to force compliance with an approved plan.
(5) Failure of the delegated program to comply with the provisions of its application for delegation.

M. Upon suspension of the delegation, the implementing agency has the right to file an appeal within 30 days of the notification of the suspension following procedures listed in R.72-313. The Commission shall administer the program during the appeal process.

72-305. Permit Application and Approval Process.

A. After the effective date of these regulations, unless a particular activity is exempted by these regulations, a person may not undertake a land disturbing activity without an approved stormwater management and sediment control plan from the appropriate plan approval agency that is consistent with the following items:

(1) Chapter 14, Title 48, South Carolina Code, relating to erosion and sediment control and stormwater management, and
(2) These regulations, or duly adopted county or municipal ordinances or programs that are adopted as a part of the delegation process and set minimum standards equivalent to these regulations.

B. Specific requirements of the permit application and approval process are generally based on the extent of the land disturbing activity. The permit application and approval procedure is as follows:

(1) For land disturbing activities involving two (2) acres or less of actual land disturbance which are not part of a larger common plan of development or sale, the person responsible for the land disturbing activity shall submit a simplified stormwater management and sediment control plan meeting the requirements of R.72-307H. This plan does not require approval by the implementing agency and does not require preparation or certification by the designers specified in R.72-305H and R.72-305I.
(2) For land disturbing activities involving more than two (2) acres and less than five (5) acres of actual land disturbance which are not part of a larger common plan of development or sale, a simplified permitting and approval process will be used meeting the requirements of R.72-307I. These activities are required to utilize Best Management Practices (BMP's) to control erosion and sediment and to utilize appropriate measures to control the quantity of stormwater runoff. Plans and specifications for these activities will be prepared by the designers cited in R.72-305H and R.72-305I. The implementing agency will review these submissions within a ten working day period. If action is not taken by the end of the review period, the plan will be considered approved.
(3) For land disturbing activities disturbing five (5) acres or greater, the requirements of R.72-305 and R.72-307 will apply. However, the use of measures other than ponds to achieve water quality

improvement are recommended on sites containing less than ten (10) disturbed acres. Plans and specifications for these activities will be prepared by the designers specified in R.72-305H or R.72-305I.

(4) These requirements may be modified on a case-by-case basis to address specific stormwater quantity or quality problems or to meet S.C. Coastal Council or other regulatory requirements. Requests for waivers or variances from these requirements will be made in accordance with the provisions of R.72-302.

(5) When the land disturbing activity consists of the construction of a pond, lake or reservoir which is singly built and not part of a permitted land disturbing activity, the following procedures will apply:

(a) A stormwater management and sediment control plan will not be required if the pond, lake or reservoir is permitted under the S.C. Dams and Reservoirs Safety Act or has received a Certificate of Exemption from the S.C. Dams and Reservoirs Safety Act. Best management practices should be used to minimize the impact of erosion and sediment.

(b) A stormwater management and sediment control plan will be required for the construction of all ponds, lakes or reservoirs not meeting the conditions in R.72-305B(5)(a) that otherwise meet the size requirements for stormwater management and sediment control plan approval.

C. A stormwater management and sediment control plan or an application for a waiver shall be submitted to the appropriate plan approval agency by the person responsible for the land disturbing activity for review and approval for a land disturbing activity, unless otherwise exempted. The stormwater management and sediment control plan shall contain supporting computations, drawings, and sufficient information describing the manner, location, and type of measures in which stormwater runoff will be managed from the entire land disturbing activity. The appropriate plan approval agency shall review the plan to determine compliance with the requirements of these regulations prior to approval. The approved stormwater management and sediment control plan shall serve as the basis for water quantity and water quality control on all subsequent construction.

D. All stormwater management and sediment control plans submitted for approval shall contain certification by the person responsible for the land disturbing activity that the land disturbing activity will be accomplished pursuant to the approved plan and that responsible personnel will be assigned to the project.

E. All stormwater management and sediment control plans shall contain certification by the person responsible for the land disturbing activity of the right of the Commission or implementing agency to conduct on-site inspections.

F. The stormwater and sediment management plan shall not be considered approved without the inclusion of an approval stamp with a signature and date on the plans by the appropriate plan approval agency. The stamp of approval on the plans is solely an acknowledgement of satisfactory compliance with the requirements of these regulations. The approval stamp does not constitute a representation or warranty to the applicant or any other person concerning the safety, appropriateness of effectiveness of any provision, or omission from the stormwater and sediment plan.

G. When the local conservation district is not the plan approval agency, the conservation district may request to review and comment on stormwater management and sediment control plans. Failure of the conservation district to provide comments by the date specified by the local implementing agency will not delay the approval of the stormwater management and sediment control plans by the implementing agency.

H. All stormwater management and sediment control plans submitted to the appropriate plan approval agency for approval shall be certified by the designer. The following disciplines may certify and stamp/seal plans as allowed by their respective licensing act and regulations:

(1) Registered professional engineers as described in Title 40, Chapter 22.
(2) Registered landscape architects as described in Title 40, Chapter 28, Section 10, item (b).
(3) Tier B land surveyors as described in Title 40, Chapter 22.

I. Pursuant to Title 40, Chapter 22, Section 460, stormwater management and sediment control plans may be prepared by employees of the federal government and submitted by the person responsible for the land disturbing activity to the appropriate plan approval agency for approval.

J. These regulations do not prohibit other disciplines or Certified Professionals, including, but not limited to, Certified Professional Erosion and Sediment Control Specialists, which have appropriate background and experience from taking active roles in the preparation of the plan and design process. All plans and specifications submitted to the appropriate plan approval agency for approval shall be stamped/sealed by those listed in R.72-305H or prepared by employees of the federal government under R.72-305I.

K. Approved plans remain valid for 5 years from the date of an approval. Extensions or renewals of the plan approvals will be granted by the plan approval agency upon written request by the person responsible for the land disturbing activity.

L. Approvals of land disturbing activities which were approved prior to the effective date of these regulations shall remain in effect for the original term of the approval. For land disturbing activities which were not initiated during the original term of approval, the person responsible for the land disturbing activity shall resubmit the stormwater management and sediment control plan to the appropriate plan approval agency for review and approval subject to the requirements of these regulations.

M. Upon receipt of a completed application for sediment and stormwater management, the appropriate plan approval agency shall accomplish its review and have either the approval or review comments transmitted to the applicant within 20 working days. If notice is not given to the applicant or if action is not taken by the end of the 20 working day period, the applicants plan will be considered approved.

N. One year after the effective date of Chapter 14, Title 48 of the Code of Laws of South Carolina, a federal agency or facility may not undertake a land disturbing activity unless the agency has submitted a stormwater management and sediment control plan for the specific activity to the Commission and the plan has been approved.

In lieu of submitting individual plans for approval, the federal agency or facility may submit an application for a general permit to the Commission for approval.

O. A local government or special purpose or public service district may request a general permit for its regulated activities from the Commission. If a local government's or special purpose or public service district's request is approved, individual stormwater management and sediment control plans for regulated land disturbing activities will not be required.

72-306. Fees.

A. The fees associated with the plan review and approval process inspection and enforcement shall be set by the implementing agency. If permit fees are established, they shall be established in accordance with the following items:

(1) Delegation of program elements will depend, to a large extent, on funding and personnel commitments. If the delegated jurisdiction has a source of funding that is provided through local revenues, then the implementation of the delegated component will not necessitate the imposition of a permit fee to cover the cost of the delegated program component.

(2) In the event that one component of an overall stormwater management and sediment control program is not funded through the use of general or special funds, a non-refundable permit fee may be collected at the time that the stormwater management and sediment control plan or application for waiver or variance is submitted or approved. The permit fee will provide for the unfunded costs of plan review, administration and management of the permitting office, construction review, maintenance inspection, and education and training. The plan review or permit approval agency shall be responsible for the collection of the permit fee. Unless all program elements in a county or municipality have been delegated to a single agency, the funds

collected not supporting the plan review function shall be distributed to the appropriate agencies.

(3) The number of needed personnel and the direct and indirect expenses associated with those personnel shall be developed by the agencies requesting delegation in a specific jurisdiction. Those expenses will then form the basis for determining unit plan approval costs by the local government.

B. Where the Commission is the implementing agency, the Commission may assess a fee not to exceed $100.00 per disturbed acre up to a maximum of $2000.00. No fee will be charged for land disturbing activities which disturb two acres or less. The Commission may also charge a fee not to exceed $100.00 to review an application for a waiver or variance from the requirements of these regulations. No fee will be charged for extensions or renewal of plan approval unless there are significant changes to the plans.

C. A maintenance fee may be required on approvals granted for stormwater management structures that will be maintained by a local government.

72-307. Specific Design Criteria, Minimum Standards and Specifications.

A. General submission requirements for all projects requiring stormwater management and sediment control plan approval will include the following information as applicable:

(1) A standard application form,

(2) A vicinity map indicating north arrow, scale, and other information necessary to locate the property or tax parcel,

(3) A plan at an appropriate scale accompanied by a design report and indicating at least:

(a) The location of the land disturbing activity shown on a USGS 7.5 minute topographic map or copy.

(b) The existing and proposed topography, overlayed on a current plat showing existing and proposed contours as required by the implementing agency. The plat and topographic map should conform to provisions of Article 4, Regulations 400-490.

(c) The proposed grading and earth disturbance including:

1. Surface area involved; and
2. Limits of grading including limitation of mass clearing and grading whenever possible.

(d) Stormwater management and stormwater drainage computations, including:

1. Pre- and post-development velocities, peak rates of discharge, and inflow and outflow hydrographs of stormwater runoff at all existing and proposed points of discharge from the site,
2. Site conditions around points of all surface water discharge including vegetation and method of flow conveyance from the land disturbing activity, and
3. Design details for structural controls.

(e) Erosion and sediment control provisions, including:

1. Provisions to preserve top soil and limit disturbance;
2. Details of site grading; and
3. Design details for structural controls which includes diversions and swales.

(4) Federal Emergency Management Agency flood maps and federal and State wetland maps, where appropriate.

(5) The appropriate plan approval agency shall require that plans and design reports be sealed by a qualified design professional that the plans have been designed in accordance with approved sediment and stormwater ordinances and programs, regulations, standards and criteria.

(6) Additional information necessary for a complete project review may be required by the appropriate plan approval agency as deemed appropriate. This additional information may include items such as public sewers, water lines, septic fields, wells, etc.

B. Specific requirements for the erosion and sediment control portion of the stormwater management and sediment control plan approval process include, but are not limited to, the following items. The appropriate plan approval agency may modify the following items for a specific project or type of

project.

(1) All plans shall include details and descriptions of temporary and permanent erosion and sediment control measures and other protective measures shown on the stormwater and sediment management plan. Procedures in a stormwater and sediment management plan shall provide that all sediment and erosion controls are inspected at least once every seven calendar day and after any storm event of greater than 0.5 inches of precipitation during any 24-hour period.

(2) Specifications for a sequence of construction operations shall be contained on all plans describing the relationship between the implementation and maintenance of sediment controls, including permanent and temporary stabilization and the various stages or phases of earth disturbance and construction. The specifications for the sequence of construction shall, at a minimum, include the following activities:

(a) Clearing and grubbing for those areas necessary for installation of perimeter controls;
(b) Installation of sediment basins and traps;
(c) Construction or perimeter controls;
(d) Remaining clearing and grubbing;
(e) Road grading;
(f) Grading for the remainder of the site;
(g) Utility installation and whether stormdrains will be used or blocked until after completion of construction;
(h) Final grading, landscaping, or stabilization; and
(i) Removal of sediment controls.

Changes to the sequence of construction operations may be modified by the person conducting the land disturbing activity or their representative and do not constitute a violation unless measures to control stormwater runoff and sediment are not utilized.

(3) The plans shall contain a description of the predominant soil types on the site, as described by the appropriate soil survey information available through the Commission or the local Conservation District.

(4) When work in a live waterway is performed, precautions shall be taken to minimize encroachment, control sediment transport and stabilize the work area to the greatest extent possible during construction.

(5) Vehicle tracking of sediments from land disturbing activities onto paved public roads carrying significant amounts of traffic (ADT of 25 vehicles/day or greater) shall be minimized.

C. Specific requirements for the permanent stormwater management portion of the stormwater management and sediment control plan approval process include, but are not limited to, the following items. The appropriate plan approval agency may modify the following items for a specific project or type or project.

(1) It is the overall goal of the Commission to address stormwater management on a watershed basis to provide a cost effective water quantity and water quality solution to the specific watershed problems. These regulations will provide general design requirements that must be adhered to in the absence of Designated Watershed specific criteria.

(2) All hydrologic computations shall be accomplished using a volume based hydrograph method acceptable to the Commission. The storm duration for computational purposes for this method shall be the 24-hour rainfall event, SCS distribution with a 0.1 hour burst duration time increment. The rational and/or modified rational methods are acceptable for sizing individual culverts or stormdrains that are not part of a pipe network or system and do not have a contributing drainage area greater than 20 AC. The storm duration for computational purposes for this method shall be equal to the time of concentration of the contributing drainage area or a minimum of 0.1 hours, whichever is less.

(3) Stormwater management requirements for a specific project shall be based on the entire area to be developed, or if phased, the initial submittal shall control that area proposed in the initial phase and establish a procedure and obligation for total site control.

(4) Water quantity control is an integral component of overall stormwater management. The following design criteria for flow control is established for water quantity control purposes, unless

a waiver is granted based on a case-by-case basis:

(a) Post-development peak discharge rates shall not exceed pre-development discharge rates for the 2- and 10- year frequency 24-hour duration storm event. Implementing agencies may utilize a less frequent storm event (e.g. 25-year, 24-hour) to address existing or future stormwater quantity or quality problems.

(b) Discharge velocities shall be reduced to provide a nonerosive velocity flow from a structure, channel, or other control measure or the velocity of the 10-year, 24-hour storm runoff in the receiving waterway prior to the land disturbing activity, whichever is greater.

(c) Watersheds, other than Designated Watersheds, that have well documented water quantity problems may have more stringent, or modified, design criteria determined by the local government that is responsive to the specific needs of that watershed.

(5) Water quality control is also an integral component of stormwater management. The following design criteria is established for water quality protection unless a waiver or variance is granted on a case-by-case basis.

(a) When ponds are used for water quality protection, the ponds shall be designed as both quantity and quality control structures. Sediment storage volume shall be calculated considering the clean out and maintenance schedules specified by the designer during the land disturbing activity. Sediment storage volumes may be predicted by the Universal Soil Loss Equation or methods acceptable to the Commission.

(b) Stormwater runoff that drains to a single outlet from land disturbing activities which disturb ten acres or more shall be controlled during the land disturbing activity by a sediment basin where sufficient space and other factors allow these controls to be used until the final inspection. The sediment basin shall be designed and constructed to accommodate the anticipated sediment loading from the land-disturbing activity and meet a removal efficiency of 80 percent suspended solids or 0.5 ML/L peak settleable solids concentration, whichever is less. The outfall device or system design shall take into account the total drainage area flowing through the disturbed area to be served by the basin.

(c) Other practices may be acceptable to the appropriate plan approval agency if they achieve an equivalent removal efficiency of 80 percent for suspended solids or 0.5 ML/L peak settleable solids concentration, which ever is less. The efficiency shall be calculated for disturbed conditions for the 10-year 24-hour design event.

(d) Permanent water quality ponds having a permanent pool shall be designed to store and release the first ½ inch of runoff from the site over a 24 hour period. The storage volume shall be designed to accommodate, at least, ½ inch of runoff from the entire site.

(e) Permanent water quality ponds, not having a permanent pool, shall be designed to release the first inch of runoff from the site over a 24-hour period.

(f) Permanent infiltration practices, when used, shall be designed to accept, at a minimum, the first inch of runoff from all impervious areas.

(g) For activities in the eight coastal counties of Beaufort, Berkeley, Charleston, Colleton, Dorchester, Georgetown, Jasper and Horry, additional water quality requirements may be imposed to comply with the S.C. Coastal Council Stormwater Management Guidelines. If conflicting requirements exist for activities in the eight coastal counties, the S.C. Coastal Council guidelines will apply.

(6) Where ponds are the proposed method of control, the person responsible for the land disturbing activity shall submit to the approving agency, when required, an analysis of the impacts of stormwater flows downstream in the watershed for the 10- and 100-year frequency storm event. The analysis shall include hydrologic and hydraulic calculations necessary to determine the impact of hydrograph timing modifications of the proposed land disturbing activity, with and without the pond. The results of the analysis will determine the need to modify the pond design or to eliminate the pond requirement. Lacking a clearly defined downstream point of constriction, the downstream impacts shall be established, with the concurrence of the implementing agency.

(7) Where existing wetlands are intended as a component of an overall stormwater management system, the approved stormwater management and sediment control plan shall not be implemented until all necessary federal and state permits have been obtained.

(8) Designs shall be in accordance with standards developed or approved by the Commission.
(9) Ease of maintenance must be considered as a site design component. Access to the stormwater management structure must be provided.
(10) A clear statement of defined maintenance responsibility shall be established during the plan review and approval process.
(11) Infiltration practices have certain limitations on their use on certain sites. These limitations include the following items:
  (a) Areas draining to these practices must be stabilized and vegetative filters established prior to runoff entering the system. Infiltration practices shall not be used if a suspended solids filter system does not accompany the practice. If vegetation is the intended filter, there shall be, at least a 20 foot length of vegetative filter prior to stormwater runoff entering the infiltration practice;
  (b) The bottom of the infiltration practice shall be at least 0.5 feet above the seasonal high water table, whether perched or regional, determined by direct piezometer measurements which can be demonstrated to be representative of the maximum height of the water table on an annual basis during years of normal precipitation, or by the depth in the soil at which mottling first occurs;
  (c) The infiltration practice shall be designed to completely drain of water within 72 hours;
  (d) Soils must have adequate permeability to allow water to infiltrate. Infiltration practices are limited to soils having an infiltration rate of least 0.30 inches per hour. Initial consideration will be based on a review of the appropriate soil survey, and the survey may serve as a basis for rejection. On-site soil borings and textural classifications must be accomplished to verify the actual site and seasonal high water table conditions when infiltration is to be utilized;
  (e) Infiltration practices greater than three feet deep shall be located at least 10 feet from basement walls;
  (f) Infiltration practices designed to handle runoff from impervious parking areas shall be a minimum of 150 feet from any public or private water supply well;
  (g) The design of an infiltration practice shall provide an overflow system with measures to provide a non-erosive velocity of flow along its length and at the outfall;
  (h) The slope of the bottom of the infiltration practice shall not exceed five percent. Also, the practice shall not be installed in fill material as piping along the fill/natural ground interface may cause slope failure;
  (i) An infiltration practice shall not be installed on or atop a slope whose natural angle of incline exceeds 20 percent.
  (j) Clean outs will be provided at a minimum, every 100 feet along the infiltration practice to allow for access and maintenance.
(12) A regional approach to stormwater management is an acceptable alternative to site specific requirements and is encouraged.

D. All stormwater management and sediment control practices shall be designed, constructed and maintained with consideration for the proper control of mosquitoes and other vectors. Practices may include, but are not limited to:

(1) The bottom of retention and detention ponds should be graded and have a slope not less than 0.5 percent.
(2) There should be no depressions in a normally dry detention facility where water might pocket when the water level is receding.
(3) Normally dry detention systems and swales should be designed to drain within three (3) days.
(4) An aquatic weed control program should be utilized in permanently wet structures to prevent an overgrowth of vegetation in the pond. Manual harvesting is preferred.
(5) Fish may be stocked in permanently wet retention and detention ponds.
(6) Normally dry swales and detention pond bottoms should be constructed with a gravel blanket or other measure to minimize the creation of tire ruts during maintenance activities.

E. A stormwater management and sediment control plan shall be filed for a residential development and the buildings constructed within, regardless of the phasing of construction.

(1) In applying the stormwater management and sediment control criteria, in R.72-307, individual lots in a residential subdivision development shall not be considered to be separate land disturbing activities and shall not require individual permits. Instead, the residential subdivision development, as a whole, shall be considered to be a single land disturbing activity. Hydrologic parameters that reflect the ultimate subdivision development shall be used in all engineering calculations.

(2) If individual lots or sections in a residential subdivision are being developed by different property owners, all land-disturbing activities related to the residential subdivision shall be covered by the approved stormwater management and sediment control plan for the residential subdivision. Individual lot owners or developers may sign a certificate of compliance that all activities on that lot will be carried out in accordance with the approved stormwater management and sediment control plan for the residential subdivision. Failure to provide this certification will result in owners or developers of individual lots developing a stormwater management and sediment control plan meeting the requirements of R.72-307.

(3) Residential subdivisions which were approved prior to the effective date of these regulations are exempt from these requirements. Development of new phases of existing subdivisions which were not previously approved shall comply with the provisions of these regulations.

F. Risk analysis may be used to justify a design storm event other than prescribed or to show that rate and volume control is detrimental to the hydrologic response of the basin and therefore, should not be required for a particular site.

(1) A complete watershed hydrologic/hydraulic analysis must be done using a complete model/procedure acceptable to the implementing agency. The level of detail of data required is as follows:

(a) Watershed designation on the 7.5 minute topo map exploded to a minimum of 1" = 400'.

(b) Inclusion of design and performance data to evaluate the effects of any structures which effect discharge. Examples may be ponds or lakes, road crossings acting as attenuation structures and there may be others which must be taken into account.

(c) Land use data shall be taken from the most recent aerial photograph and field checked and updated.

(d) The water surface profile shall be plotted for the conditions of pre- and post-development for the 10-, and 100-year 24-hour storm.

(e) Elevations of any structure potentially damaged by resultant flow shall also be shown.

(2) Based on the results of this type of evaluation, the certified plan reviewer representing the implementing agency shall review and evaluate the proposed regulation waiver or change.

G. The general permit application for use by federal, local governments, or special purpose or public service districts shall contain, as a minimum, standard plans and specifications for stormwater management and erosion and sediment control; methods used to calculate stormwater runoff, soil loss and control method performance; staff assigned to monitor land disturbing activities and procedures to handle complaints for off-site property owners and jurisdictions.

This general permit will be valid for a period of three years and will be subject to the same review criteria by the Commission as that of the delegated program elements.

The use of the general permit classification does not relinquish a land disturbing activity from the requirements of these Regulations. Rather, the general permit precludes that activity from the necessity of a specific plan review for each individual project.

Approval of a general permit does not relieve any agency from the conditions that are part of the general permit approval regarding the implementation of control practices as required by the general permit. Failure to implement control practices pursuant to conditions included in the general permit may result in the revocation of the general permit and the requirement of the submission of individual plans for each activity.

H. The stormwater management and sediment control plan required for land disturbing activities of two (2) acres or less which are not part of a larger common plan of development or sale shall contain the

following information, as applicable:

(1) An anticipated starting and completion date of the various stages of land disturbing activities and the expected date the final stabilization will be completed;
(2) A narrative description of the stormwater management and sediment control plan to be used during land disturbing activities;
(3) General description of topographic and soil conditions of the tract from the local soil and water conservation district;
(4) A general description of adjacent property and a description of existing structures, buildings, and other fixed improvements located on surrounding properties;
(5) A sketched plan (engineer's, Tier B surveyor's or landscape architect's seal not required) to accompany the narrative which shall contain:
   (a) A site location drawing of the proposed project, indicating the location of the proposed project in relation to roadways, jurisdictional boundaries, streams and rivers;
   (b) The boundary lines of the site on which the work is to be performed;
   (c) A topographic map of the site if required by the implementing agency;
   (d) The location of temporary and permanent vegetative and structural stormwater management and sediment control measures.
(6) Stormwater management and sediment control plans shall contain certification by the person responsible for the land disturbing activity that the land disturbing activity will be accomplished pursuant to the plan.
(7) All stormwater management and sediment control plans shall contain certification by the person responsible for the land disturbing activity of the right of the Commission or implementing agency to conduct on-site inspections.

The requirements contained above may be indicated on one plan sheet.

I. The stormwater management and sediment control plan for land disturbing activities of greater than two (2) acres but less than five (5) acres which are not part of a larger common plan of development or sale shall contain the following information, as applicable:

(1) An abbreviated application form;
(2) A vicinity map sufficient to locate the site and to show the relationship of the site to its general surroundings at a scale of not smaller than one (1) inch to one (1) mile.
(3) The site drawn to a scale of not smaller than one (1) inch to 200 feet, showing:
   (a) The boundary lines of the site on which the work is to be performed, including the approximate acreage of the site;
   (b) Existing contours and proposed contours as required by the implementing agency;
   (c) Proposed physical improvements on the site, including present development and future utilization if future development is planned;
   (d) A plan for temporary and permanent vegetative and structural erosion and sediment control measures which specify the erosion and sediment control measures to be used during all phases of the land disturbing activity and a description of their proposed operation;
   (e) Provisions for stormwater runoff control during the land disturbing activity and during the life of the facility, including a time schedule and sequence of operations indicating the anticipated starting and completion dates of each phase and meeting the following requirements:
      1. Post-development peak discharge rates shall not exceed pre-development discharge rates for the 2- and 10- year frequency 24-hour duration storm event. Implementing agencies may utilize a less frequent storm event (e.g. 25-year, 24-hour) to address existing or future stormwater quantity or quality problems.
      2. Discharge velocities shall be reduced to provide a nonerosive velocity flow from a structure, channel, or other control measure or the velocity of the 10-year, 24-hour storm runoff in the receiving waterway prior to the land disturbing activity, whichever is greater.
   (f) A complete and adequate grading plan for borrow pits and material processing facilities where applicable, including restoration and revegetation measures;

(g) A general description of the predominant soil types on the site;
(h) A description of the maintenance program for stormwater management and sediment control facilities including inspection programs.

(4) All stormwater management and sediment control plans submitted for approval shall contain certification by the person responsible for the land disturbing activity that the land disturbing activity will be accomplished pursuant to the approved plan.

(5) All stormwater management and sediment control plans shall contain certification by the person responsible for the land disturbing activity of the right of the Commission or implementing agency to conduct on-site inspections.

(6) All stormwater management and sediment control plans submitted to the appropriate plan approval agency for approval shall be certified by the designer. The following disciplines may certify and stamp/seal plans as allowed by their respective licensing act and regulations:
(a) Registered professional engineers as described in Title 40, Chapter 22.
(b) Registered landscape architects as describe in Title 40, Chapter 28, Section 10, item (b).
(c) Tier B land surveyors as described in Title 40, Chapter 22.

(7) Pursuant to Title 40, Chapter 22, Section 460, stormwater management and sediment control plans may be prepared by employees of the federal government and submitted by the person responsible for the land disturbing activity to the appropriate plan approval agency for approval.

72-308. Maintenance Requirements and Off-Site Damage Correction.

A. The Commission will provide technical assistance to local governments who choose to assume the maintenance responsibility for stormwater management structures on, at least, residential lands.

B. The person responsible for maintenance shall perform or cause to be performed preventive maintenance of all completed stormwater management practices to ensure proper functioning. The responsible inspection agency shall ensure preventive maintenance through inspection of all stormwater management practices.

C. Inspection reports shall be maintained by the responsible inspection agency on all detention and retention structures and shall include the following items (as applicable):

(1) The date of inspection;
(2) The name of the inspector;
(3) The condition of (if applicable):
(a) Vegetation,
(b) Fences,
(c) Spillways,
(d) Embankments,
(e) Reservoir area,
(f) Outlet channels,
(g) Underground drainage,
(h) Sediment load, or
(i) Other items which could effect the proper function of the structure.
(4) Description of needed maintenance.

D. Responsible inspection agencies shall provide procedures to ensure that deficiencies indicated by inspections are rectified. The procedures shall include the following:

(1) Notification to the person responsible for maintenance of deficiencies including a time frame for repairs;
(2) Subsequent inspection to ensure completion of repairs; and
(3) Effective enforcement procedures or procedures to refer projects to the Commission if repairs are not undertaken or are not done properly.

E. The following criteria shall be used by the appropriate implementing agency in evaluating and for correcting off-site damages resulting from the land disturbing activity:

(1) Determine the extent of damage by sediment resulting from non-compliance with the approved stormwater management and sediment control plan,
(2) Determine the classification of the impaired waterbody, if any,
(3) Determine the impact and severity of the damage resulting from non-compliance with the approved stormwater management and sediment control plan,
(4) Develop an agreement with landowners for cleanup and corrections, including a schedule of implementation.
(5) Evaluate the alternatives for correction of the damage and prevention of future damage, and
(6) Failure to implement the agreement in the required schedule will constitute a violation of these regulations.

72-309. Criteria For Designated Watersheds.

The concept of designated watersheds is intended, not only to prevent existing water quantity and water quality problems from getting worse, but also to reduce existing flooding problems and to improve existing water quality or meet State Water Quality Standards through a reduction of the impacts of NPS pollution in selected watersheds. Further, the designation of watersheds under this section may also be used to protect watersheds which do not currently have significant water quality or quantity problems, but which require protection in order to avoid or mitigate the occurrence of future problems which might impair current or protected multiple water uses or important water resources within the watershed. Criteria is established for designated watersheds and these criteria will depend on whether the specific problems of the watershed are water quantity or water quality oriented. Water quantity and water quality concerns will be considered in all designated watersheds, but the overall emphasis for each designated watershed will depend on its existing and future water quality and quantity issues as well as consideration of the multiple offstream and instream water uses within the watershed.

A. To initiate consideration of a watershed for Designated Watershed status, a watershed shall be recommended by a local government or combinations of local governments through the passage of a local ordinance to the Commission. Upon recommendation to the Commission, the Commission shall publish the request in the State Register and contact all involved agencies at the local and state level within 30 days after receipt of the designation request and their input received prior to any consideration of the designation is made.

B. Included with the recommendation of a watershed for Designated Watershed status to the Commission shall be an identification of the specific problems that exist in the watershed so that the pursuit of a watershed study is warranted. Designation as a Designated Watershed requires approval by the Commission, the South Carolina Water Resources Commission and the South Carolina Department of Health and Environmental Control. A significant water quantity or water quality problem must exist that would support this designation. Also, inclusion of a watershed as a Designated Watershed will necessitate a public hearing process. The process of designating a watershed shall be based on the following information:

(1) An estimate of the potential for land disturbing activities to be initiated in the basin which would be regulated under this regulation. This estimate could utilize historical and projected population growth, land use data, and other such appropriate measures to estimate the nonpoint source pollution contribution or stormwater runoff which could be reduced or avoided,
(2) An inventory of the offstream and instream water uses in the watershed to quantify and characterize the benefits associated with reducing current or avoiding future water resources problems in the watershed. These could include water supply intakes, State navigable waters, recreational resources, fisheries resources, wetlands, or other such important uses,
(3) Water quality data, collected through either the statewide water quality inventory, or other special studies inclusive of benthic macroinvertebrate data,
(4) Historical and estimated flood damage and/or estimated flood protection benefits to both private and public property in the watershed,
(5) Status of current or description of proposed State and Federal flood protection and flood plain management program(s) and activities in the watershed, and

(6) Dangers to public health and welfare.

C. Following an adequate review of the recommendation, staff of the Commission, South Carolina Water Resources Commission, and the South Carolina Department of Health and Environmental Control shall meet to review and discuss their decision regarding designation. The staff shall prepare a statement in support of, or objection to, the proposed designation within 120 days following receipt of the recommendation by the Commission. The statement shall be voted upon by the appointed commissioners of each respective agency. Ex-officio members of the South Carolina Water Resources Commission representing the Land Resources Conservation Commission and the South Carolina Department of Health and Environmental Control shall abstain from voting regarding designation at the meeting of the South Carolina Water Resources Commission. Approval by each of the three agencies shall constitute designation.

D. Upon approval of designation, a Watershed Advisory Committee shall be established to advise and provide guidance in the development and conduct of the watershed master plan. The Commission, South Carolina Water Resources Commission, and the South Carolina Department of Health and Environmental Control will appoint the Watershed Advisory Committee which shall include State, District, local government representatives, and also representatives of the regulated community within the watershed and other persons which may be affected by the plan.

E. The general components contained in the actual watershed study shall be the following items:

(1) Stormwater quantity or water quality problem identification,
(2) The overall needs of the watershed including the additional impacts of new land disturbing activities,
(3) Alternative approaches to address the existing and future problems,
(4) A selected approach that includes the overall costs and benefits,
(5) An economic impact analysis of the selected approach,
(6) Schedule for implementation,
(7) Funding sources that are available for the actual implementation of study recommendations, and
(8) A public hearing prior to final Commission, S.C. Water Resources Commission and S.C. Department of Health and Environmental Control approval of the watershed study.

F. The following goals are to be obtained through the implementation of the Designated Watershed program:

(1) Reduction of existing flooding or water quality impacts,
(2) Prevention of future flooding or water quality impacts, and
(3) Minimization of economic and social losses.

G. Specific plan components of a watershed study shall include, but not be limited to, the following items:

(1) The limits of the watershed.
(2) An inventory of existing water quality data.
(3) An inventory of areas having significant natural resource value as defined in existing State or local studies as they may be impacted by the construction of location of stormwater control structures.
(4) An inventory of areas of historical and archaeological value identified in existing State or local studies as they may be impacted by the construction or location of stormwater control structures,
(5) A map or series of maps of the watershed showing the following information:
    (a) Watershed topography,
    (b) Significant geologic formations,
    (c) Soils information,
    (d) Existing land use based on existing zoning,
    (e) Proposed land use based on expected zoning or comprehensive plans,
    (f) Locations where water quality data were obtained.
    (g) Locations of existing flooding problems including floor and corner elevations of structures already impacted, and

(h) 100-year floodplain delineations, water surface profiles, and storm hydrographs at selected watershed location.

(6) An inventory of the existing natural and constructed stormwater management system.

(7) An inventory of historic flood damage sites, including frequency and damage estimates,

72-310. Criteria For Implementation of a Stormwater Utility.

The implementation of a stormwater utility will necessitate the development of a local utility ordinance or special taxing assessment prior to its implementation, pursuant to Chapter 9, Title 4, 1976 Code of Laws as amended by Act 114 1991. There are essential components that an ordinance must contain to function as a funding mechanism for stormwater management and those components shall include, but not be limited to, the following items:

A. The financing of a stormwater utility with a user charge system must be reasonable and equitable so that each user of the stormwater system pays to the extent to which the user contributes to the need for the stormwater system, and that the charges bear a substantial relationship to the cost of the service. The use of county and municipal taxpayer rolls and accounting systems are allowed for the assessment and collection of fees.

B. The intent of the utility must be clearly defined regarding program components that are to be funded through the utility. Those components may include but not be limited to the following activities:

(1) Preparation of comprehensive watershed master plans for stormwater management,

(2) Annual inspections of all stormwater management facilities, both public and private,

(3) Undertaking regular maintenance, through contracting or other means, of stormwater management structures that have been accepted for maintenance.

(4) Plan review and inspection of sediment control and stormwater management plans and practices, and

(5) Retrofitting designated watersheds, through contracting or other means, to reduce existing flooding problems or to improve water quality.

C. The authority for the creation of the stormwater utility and the imposition of charges to finance sediment and stormwater activities is conferred in Chapter 14, Title 48, South Carolina Code. The application of a stormwater utility by means of a local ordinance or other means shall not be deemed a limitation or repeal of any other powers granted by State statute.

D. The creation of a stormwater utility shall include the following components:

(1) The boundaries of the utility, such as watersheds or jurisdictional boundaries as identified by the local governing body,

(2) The creation of a management entity,

(3) Identification of stormwater problems,

(4) Method for determining utility charges,

(5) Procedures for investment and reinvestment of funds collected, and

(6) An appeals or petition process.

E. As established by local ordinance or special election or petition, the local government shall have responsibility for implementing all aspects of the utility including long range planning, plan implementation, capital improvements, maintenance of stormwater facilities, determination of charges, billing, and hearing of appeals and petitions. The local government also will have responsibility for providing staff support for utility implementation.

F. With the respect to new stormwater management facilities constructed by private developers, the local government shall develop criteria for use in determining whether these will be maintained by the utility or by the facility owner. Such criteria may include whether the facility has been designed primarily to serve residential users and whether it has been designed primarily for purposes of stormwater management. In situations where it is determined that public maintenance is not preferable, standards shall be developed to ensure that inspection of facilities occurs annually and that facilities are

maintained as needed.

G. The use of charges is limited to those purposes for which the utility has been established, including but not limited to: planning; acquisition of interests in land including easements; design and construction of facilities; maintenance of the stormwater system; billing and administration; and water quantity and water quality management, including monitoring, surveillance, private maintenance inspection, construction inspection, and other activities which are reasonably required.

72-311. Plan Review and Inspector Certification Programs.

A. The Commission shall require that local governments which request delegation of stormwater management and sediment control plan review and approval/disapproval shall have a Certified Plan Reviewer representing the implementing agency. Certified Plan Reviewers shall obtain certification from the Commission by successfully completing a Commission sponsored or approved training program. Exceptions to this requirement are limited to Registered Professional Engineers, Registered Landscape Architects and Registered Tier B Land Surveyors who can receive initial certification by demonstrating to the Commission a minimum of three (3) years experience in stormwater management and sediment control planning and design. For a period of one year after the effective date of these regulations, local governments may receive interim certification for plan reviewers during the period before attendance at a Commission sponsored or approved training course by submitting an enrollment form to the Commission. Interim certification shall be valid until the scheduled date of attendance.

B. The Commission shall require that local governments which request delegation of the construction and maintenance inspection component of the stormwater management and sediment control program shall have a Certified Construction Inspector representing the implementing agency. Certified Construction Inspectors shall obtain certification from the Commission by successfully completing a Commission sponsored or approved training program. For a period of one year after the effective date of these regulations, local governments may receive interim certification for construction inspectors during the period before attendance at a Commission sponsored or approved training course by submitting an enrollment form to the Commission. Interim certification shall be valid until the scheduled date of attendance.

C. Initial certification as a Certified Plan Reviewer or Certified Construction Inspector is good for a period of five years. Recertification is contingent on attending and successfully completing a Commission sponsored or approved recertification program. This continuing education requirement applies to all Certified Plan Reviewers, including, Registered Engineers, Landscape Architects, Tier B Land Surveyors and Construction Inspectors.

72-312. Review and Enforcement Requirements.

A. Items listed in this section are activities by the Commission in the event the Commission serves as the implementing agency. When the Commission is requested to assist the implementing agency, these are suggestions the Commission may submit to the implementing agency.

B. The person responsible for the land disturbing activity shall notify the appropriate inspection agency before initiation of construction and upon project completion when a final inspection will be conducted to ensure compliance with the approved stormwater management and sediment control plan.

C. The person responsible for the land disturbing activity shall, if required by the implementing agency during the plan approval process, submit "As Built or Record Document" plans. In addition, the person responsible for the land disturbing activity may be required to submit written certification from the professional engineer, landscape architect, or Tier B land surveyor responsible for the field supervision of the land disturbing activity that the land disturbing activity was accomplished according to the approved stormwater management and sediment control plan or approved changes.

D. The responsible inspection agency shall, for inspection purposes, do all of the following items:

(1) Ensure that the approved stormwater management and sediment control plans are on the project site and are complied with;
(2) Ensure that every active site is inspected for compliance with the approved plan on a regular basis;
(3) Provide the person responsible for the land disturbing activity, a written report after every inspection that describes:
    (a) The date and location of the site inspection;
    (b) Whether the approved plan has been properly implemented and maintained;
    (c) Approved plan or practice deficiencies; and
    (d) The action taken.
(4) Notification of the person responsible for the land disturbing activity in writing when violations are observed, describing the:
    (a) Nature of the violation;
    (b) Required corrective action; and
    (c) Time period for violation correction.

E. The Commission may investigate complaints or refer any complaint received to the local inspection agency if the activity is located in a jurisdiction that has received delegation of inspections during construction and maintenance inspections. In conjunction with a referral, the Commission may also initiate an on-site investigation after notification of the local inspection agency in order to properly evaluate the complaint. The Commission shall make recommendations on enforcement action when appropriate, and notify the local implementing agency in a timely manner of any recommendations.

F. The Commission, at its discretion and upon notification to the person responsible for the land disturbing activity may visit any site to determine the adequacy of stormwater management and sediment control practices. In the event that the Commission conducts site inspection, the appropriate inspection agency shall be notified of the inspection. The appropriate inspection agency shall establish a time frame to obtain site compliance. This notification shall, in no way limit the right to the Commission to take action subsequent to any provision of these regulations or Chapter. Formal procedures for interaction between the Commission and the appropriate inspection agency on-site inspection and referral will be developed on an individual basis.

G. The appropriate plan approval agency may require a revision to the approved plans as necessary due to differing site conditions. The appropriate plan approval agency shall establish guidelines to facilitate the processing of revised plans where field conditions necessitate plan modification. Where changes to the approved plan are necessary those changes shall be in accordance to the following:

(1) Major changes to approved stormwater management and sediment control plans, such as the addition or deletion of a sediment basin, shall be submitted by the applicant to the appropriate plan approval agency for review and approval.
(2) Minor changes to stormwater management and sediment control plans may be made in the field review report. The appropriate inspection agency shall develop a list of allowable field modifications for use by the construction inspector.

H. Stormwater management construction shall have inspections accomplished as needed.

I. The agency responsible for construction inspection may, in addition to local enforcement options, refer a site violation to the Commission for review.

J. Referral of a site violation to the Commission may initiate a Commission construction inspection of the site to verify site conditions. That construction inspection may result in the following actions:

(1) Notification through appropriate means to the person engaged in a land disturbing activity to comply with the approved plan within a specified time frame; and
(2) Notification of plan inadequacy, with a time frame for the person engaged in a land disturbing activity to submit a revised sediment and stormwater plan to the appropriate plan approval agency and to receive its approval with respect thereto.

The Commission shall notify the local inspection agency within five working days of what

recommendation for enforcement action should be taken on the site.

K. Failure of the person engaged in the land disturbing activity contractor to comply with Commission requirements may result in the following actions in addition to other penalties as provided in Chapter 14.

(1) The Commission shall have the power to request the implementing agency to order any person violating any provision of Chapter 14 and these regulations to cease and desist from any site work activity other than those actions necessary to achieve compliance with any administrative order.
(2) The Commission may request that the appropriate plan approval agency refrain from issuing any further building or grading permits to the person having outstanding violations until those violations have been remedied.
(3) The Commission may recommend fines to be levied by the implementing agency.

L. If the Commission or the implementing agency utilizes "stop work orders" as a part of its inspection and enforcement program, the following procedure shall be followed:

(1) The implementing agency may issue a stop work order if it is found that a land disturbing activity is being conducted in violation of this Act or of any regulation adopted or order issued pursuant to this Act, that the violation is knowing and willful, and that either:
  (a) Off-site sedimentation resulting from non-compliance with the approved stormwater management and sediment control plan has eliminated or severely degraded a use in a lake or natural waterway or that such degradation is imminent.
  (b) Off-site sedimentation resulting from non-compliance with the approved stormwater management and sediment control plan has caused severe damage to adjacent land.
  (c) The land disturbing activity which requires an approved plan under these regulations and is being conducted without the required approved plan.
(2) The stop work order shall be in writing and shall state what work is to be stopped and what measures are required to abate the violation. The order shall include a statement of the findings made by the implementing agency pursuant to (1) of this section and shall list the conditions under which work that has been stopped by the order may be resumed. The delivery of equipment and materials which does not contribute to the violation may continue while the stop work order is in effect. A copy of this section shall be attached to the order.
(3) The stop work order shall be served by the sheriff of the county in which the land disturbing activity is being conducted or by some other person duly authorized by law to serve process, and shall be served on the person at the site of the land disturbing activity who is in operational control of the land disturbing activity. The sheriff or other person duly authorized by law to serve process shall post a copy of the stop work order in a conspicuous place at the site of the land-disturbing activity. The implementing agency shall also deliver a copy of the stop work order to any person that the implementing agency has reason to believe may be responsible for the violation.
(4) The directives of a stop work order become effective upon service of the order. Thereafter, any person notified of the stop work order who violates any of the directives set out in the order may be assessed a civil penalty as provided in R.72-315. A stop work order issued pursuant to this section may be issued for a period not to exceed three calendar days.
(5) The implementing agency shall designate an employee to monitor compliance with the stop work order. The name of the employee so designated shall be included in the stop work order. The employee so designated shall rescind the stop work order if all the violations for which the stop work order are issued are corrected, no other violations have occurred, and all measures necessary to abate the violations have been taken. The implementing agency shall rescind a stop work order that is issued in error.
(6) The issuance of a stop work order shall be a final agency decision subject to judicial review in the same manner as an order in a contested case pursuant to Title 1, Chapter 23, Section 380 of the Code of Laws of South Carolina, 1976. The petition for judicial review shall be filed in the circuit court of the county in which the land-disturbing activity is being conducted.
(7) The Commission shall file a cause of action to abate the violations which resulted in the issuance

of a stop work order within three calendar days of the service of the stop work order. The cause of action shall include a motion for an ex parte temporary restraining order to abate the violation and to effect necessary remedial measures. The resident circuit court judge, or any judge assigned to hear the motion for the temporary restraining order, shall hear and determine the motion within two days of the filing of the complaint. The clerk of circuit court shall accept complaints filed pursuant to this section without the payment of fining fees. Filing fees shall be paid to the clerk of circuit court within 30 days of the fining of the complaint.

72-313. Hearings and Hearing Procedures.

A. An administrative hearing is available, following a timely request, to determine the propriety of:
   (1) The denial of delegation of a program component.
   (2) A revocation of a delegated program component.
   (3) A denial or revocation of a permit for stormwater management and sediment control.
   (4) A citizen complaint concerning program operation.
   (5) The requirements imposed by the implementing agency for approval of the stormwater management and sediment reduction plan.
   (6) The issuance of a notice of violation or non-compliance with the approved stormwater management and sediment reduction plan.
   (7) The issuance of fines by an implementing agency.
   (8) The issuance of a stop work order by an implementing agency.

B. Requests for administrative hearings and appeals may be made to local governments when program elements are delegated by the Commission or to the Commission when the Commission functions as the implementing agency. In addition, administrative hearings and appeals may be held by the Commission regarding decisions or actions of local implementing agencies. Procedures for acting on appeals and conducting administrative hearings by local implementing agencies will be specified in their request for delegation of program element. The Commission procedures for conducting administrative hearings is specified in R.72-313C through R.72-313Q.

C. A hearing may be requested by any person. If an adverse action is involved, the hearing may be requested provided that the written request is received within thirty (30) days after the notice is given to the person.

D. All hearings shall be initiated via correspondence approved by the Commission which shall give notice to all parties of the hearing.

   (1) All parties must receive notice of the hearing of not less than thirty (30) days;
   (2) The notice shall be sent by the designated hearing officer(s);
   (3) The notice shall include:
      (a) A statement of the time, place, and nature of the hearing;
      (b) A statement of the legal authority and jurisdiction under which the hearing is to be held;
      (c) A reference to the particular sections of the statutes and rules involved;
      (d) A short and plain statement of the matters asserted. If the hearing officer(s) is/are unable to state the matters in detail at the time the notice is served, the initial notice may be limited to a statement of the issues involved. Thereafter, upon application, a more definite and detailed statement shall be furnished.

E. All hearings shall be conducted by a hearing officer(s) appointed by the Commission.

F. All hearings shall be conducted in accordance with Section 1-23-10 et. seq. of the 1976 South Carolina Code of Laws.

G. The hearing officer(s) shall issue a proposal for decision which shall be mailed to the parties.

H. Within twenty (20) days after mailing of the proposal for decision, any party may file exceptions to the hearing officer's proposal for decision.

(1) Such exceptions shall be in written form, addressed to the Chairman of the Commission, and served upon all adverse parties;
(2) The exceptions shall list all the grounds upon which the exceptions are based.

I. If no exceptions are received by the Commission within the twenty (20) day period following the mailing of the proposal for decision, the Commission shall issue a final decision.

J. If timely exceptions are received, the Commission shall send notice to the parties that the appealing party(s) has thirty (30) days to submit a brief. Following the service of the appealing party's brief, or upon the expiration of the thirty (30) day period, whichever shall occur first, the other party shall have thirty (30) days to submit a brief. All briefs must be served on the opposing parties and filed with the Commission.

K. Following receipt of all briefs, the Commission shall schedule an oral argument if requested to do so by either party.

L. The request for an oral argument must be in writing, addressed to the Chairman of the Commission, and submitted with that party's brief.

M. The oral argument shall be scheduled for the next regular Commission meeting following the filing of the last brief.

N. The oral argument shall be heard by the members of the Commission present at the Commission meeting and shall be held in accordance with the following format:

(1) The appealing party shall be given twenty minutes to present his case;
(2) The opposing party shall be given twenty minutes to present his case;
(3) The appealing party shall be given a rebuttal period of five minutes.

O. The parties by written stipulation may agree that the hearing officer's decision shall be final and binding upon the parties.

P. The final order shall be issued by the Commission, and the decision of the Commission shall represent the view of a majority of the Commission members voting on the appeal.

Q. The final order shall be written and shall comply with the provisions of Section 1-23-10 et. seq. of the 1976 South Carolina Code of Laws.

72-314. Citizen Complaint Procedure on Delegated Program Components and Individual Sites.

A. Persons may become aggrieved by land disturbing activities and program implementation. The following describes the procedure for a person to complain concerning program operation:

(1) If the program component in question has been delegated to a local implementing agency, the complaint shall be registered first in writing with that agency. An attempt to resolve the problem shall be made with the local implementing agency.
(2) In the event a solution can not be reached, the citizen may forward the complaint to the Commission for review. The Commission shall attempt to resolve the problem with the implementing agency and notify the citizen of the outcome of these efforts.
(3) If the Commission determines, based on complaints indicating a continuing pattern, that implementation of delegated program elements falls below the acceptable standards established by these regulations, the Commission may suspend or revoke the delegation in accordance with R.72-304L.
(4) All complaints filed with the Commission shall be held for a period of three years and will be considered when delegation renewal is requested by the local government.

B. Persons may complain about individual site problems or damages. The procedure is as follows:

(1) The complaint will be registered in writing with the appropriate implementing agency.
(2) If the implementing agency is not the Commission and a solution can not be reached with the local

implementing agency, the complaint should be filed with the Commission. The Commission will follow procedures listed in R.72-312E.

72-315. Penalties.

A. Any person who violates any provision of this chapter or any ordinance or regulation promulgated, enacted, adopted, or issued pursuant to this chapter by the Commission or other implementing agency, or who initiates or continues a land disturbing activity for which a stormwater management and sediment control plan is required except in accordance with the terms, conditions, and provisions of an approved plan, is subject to a civil penalty of not more than one thousand dollars. No penalty may be assessed until the person alleged to be in violation has been notified of the violation. Each day of a violation constitutes a separate violation.

B. The implementing agency shall determine the amount of the civil penalty to be assessed under this section for violations under its jurisdiction. It shall make written demand for payment upon the person responsible for the violation and set forth in detail the violation for which the penalty has been invoked. If payment is not received or equitable settlement reached within thirty days after demand for payment is made, a civil action may be filed in the circuit court in the county in which the violation is alleged to have occurred to recover the amount of the penalty. If the implementing agency is the commission, the action must be brought in the name of the State. Local governments shall refer the matters under their jurisdiction to their respective attorneys for the institution of a civil action in the name of the local government in the circuit court in the county in which the violation is alleged to have occurred for recovery of the penalty.

72-316. Severability.

If any section, subsection, sentence, clause, phrase, or portion of these regulations are for any reason held invalid or unconstitutional by any court or competent jurisdiction, such provision and such holding shall not affect the validity of the remaining portions of these regulations.

Fiscal Impact Statement:

The South Carolina Land Resources Commission estimates that two additional staff engineers will be required to operate the program.

Appendix B

Engineering Aids and Design Guidelines for Control of Sediment in South Carolina

ENGINEERING AIDS AND DESIGN GUIDELINES FOR CONTROL OF SEDIMENT IN SOUTH CAROLINA

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BIOGRAPHICAL SKETCHES

K. F. Holbrook, P.E., P.H.

K. F. Holbrook, has over 15 years experience in erosion and sediment control and is presently the Charlotte Water Resources Group Manager for Woolpert, LLP in Charlotte, North Carolina. He is a registered professional engineer in South Carolina, North Carolina, Kentucky and Tennessee. He holds a B.S. Degree in Agricultural Engineering from the University of Kentucky and an M.S. Degree in Agricultural Engineering from Clemson University. He co-authored the S.C. Stormwater Management and Sediment Reduction Act of 1991 and authored the regulations to implement this law. Currently Mr. Holbrook is working with the Louisville-Jefferson County Planning Commission and the Louiseville Jefferson County Municipal Sewer District to develop a local ordinance for erosion prevention and sediment control.

J. C. Hayes, Ph.D., P.E.

J. C. Hayes holds B.S. and M.S. Degrees in Agricultural Engineering from Clemson University and a Ph.D. Degree in Agricultural Engineering from the University of Kentucky. He is currently Professor, Chair and Department Head of the Agricultural and Biological Engineering Department at Clemson University. He has authored several textbooks, articles, professional papers and taught many short courses as well as extensive research in erosion control and sediment transport with a focus on vegetative filters.

A. W. Fogle

A. W. Fogle holds B.S. and M.S. Degrees in Agricultural Engineering from the University of Kentucky and is currently employed by the Kentucky Geological Survey as a Hydrologist. He has authored numerous articles on hydrologic and hydraulic issues. He is presently in charge of establishing the surface and groundwater monitoring program and developing a Geographical Information Database Management System for the University's new Agricultural Research Farm in Woodford County, Kentucky.

B. J. Barfield, Ph.D., P.E., P.H.

B. J. Barfield holds a B.S. Degree in Civil and Agricultural Engineering and a Ph.D. in Agricultural Engineering from Texas A&M University. He is currently Professor, Chair and Head of the Agricultural and Biological Engineering Department at Oklahoma State University. He has authored several textbooks, articles, professional papers and taught many short courses as well as extensive research in the area of erosion and sediment transport.

ENGINEERING AIDS AND DESIGN GUIDELINES FOR CONTROL OF SEDIMENT IN SOUTH CAROLINA

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ABSTRACT

Recent regulations for storm water management and sediment control have created much interest in the use of BMPs for water quality protection. Federal and state laws have given rise to many local ordinances and programs designed to meet goals and objectives of clean water. Many east coast states have had this type of legislation on the books for the past 20 years. In the late 1970's and early 1980's computer models were developed to assist with the design of BMPs. These models were cumbersome and awkward by today's standards. However, little has changed with some of these early models.

In 1991 South Carolina passed a state law to regulate storm water and sediment discharge from land disturbing activities. This legislation is very aggressive requiring removal efficiencies for sediment reduction of 80 percent. The only way to meet this requirement in design was to use the out of date computer models. Many BMPs could not be modeled directly by existing models. Therefore, the regulated community, regulators, and academia formed a partnership to develop an accurate but simplified method to predict sediment removal efficiencies from commonly used BMPs. These methods were based on the field conditions and soil types specific to South Carolina.

The SEDIMOT II model was modified for South Carolina conditions and simulations of many different scenarios in each major land resource area were done and analyzed. Charts were developed for performance of sediment ponds in upland areas and in lowlands; rock ditch checks in fine, medium, and course soils; silt fence and rock filters.

Benefits of this effort reduced design time, decreased turn around time for permits and reduced cost for the development community, and improved water quality.

INTRODUCTION

South Carolina can be characterized by four major physiographic regions or land resource areas— piedmont, sand hills, coastal plain, and tidal area. Simulations using a modified version of SEDIMOT II estimated the efficiency of structures for sediment control. Many different treatments were applied to these regions to develop engineering aids for design of sediment ponds, silt fence, and ditch checks. Treatments included multiple watershed sizes and shapes, land uses, and soil textures in each resource area. The evaluation included a range of slope lengths, pond dimensions, watershed shapes, as well as other factors required for the specific structures. Hydrographs and sedigraphs were generated for each scenario and watershed. Then sediment controls were applied to each condition and a comparison was made of the sediment removal efficiency. Graphs and charts were developed for design to avoid the use of traditional rules of thumb. The Engineering Aids and Design Guidelines are a compromise between complex site specific computer simulations and simple rules-of-thumb.

BACKGROUND

Federal and state regulations have been implemented that require the control of storm water runoff and sediment discharge. Regulations were implemented in 1992 as a result of Clean Water Act Amendments of 1987. These regulations are known as the NPDES permit requirements for construction, industrial and municipal activities. Some states have implemented storm water management regulations and/or erosion and sediment control regulations. South Carolina passed a state law for storm water management and sediment reduction in 1991. This is one of two state laws in the USA combining storm water management and erosion and sediment control into one law and regulation. The first state to pass this type of legislation was Delaware.

The South Carolina law is unique because it requires a design performance standard of 80 percent removal efficiency of total suspended solids (TSS), or an effluent limit of 0.5 ml/l settleable solids (SS). Both of these standards are based on the 10-year, 24-hour design storm event during the land disturbing activity.

Effectiveness of control is determined by either a performance design standard or a water quality standard. Most erosion and sediment control programs are cookie cutter based and apply neither a design standard or a water quality standard. Best management practices (BMPs) are applied from a preselected list and are assumed to be adequate. A design performance standard sets forth minimum requirements for design of BMPs to meet a goal of trapping efficiency or effluent standard. There is no monitoring required to prove the effectiveness. Often times this type of standard will increase the cost of construction because of the inherent conservative approach in predictive methods. Water quality standards may provide an accurate prediction of the size of controls necessary but can be extremely expensive to collect all of the necessary data and perform complex calculations for the design. Design standards are more easily used by the designer and the regulator. A preferred alternative to either of these methods is to provide a design procedure that meets a performance criteria without requiring excessive design cost. To achieve this, the

design is typically expected to be slightly conservative, but considerably less conservative than if developed from a design standard.

A typical approach under the performance philosophy is to size a control to meet a water quality standard such as total suspended solids (TSS) or settleable solids (SS) standard. Trapping efficiency is commonly used to assess performance of structures, but this fails to account for incoming sediment concentration. Specific requirements for storm water management and sediment control plan approval given by the S.C. Storm Water Management and Sediment Reduction Regulations include discharge rates and hydrographs. In addition, sediment control devices must be designed to meet a removal efficiency of 80 percent of suspended solids or 0.5 ml/l peak settleable solids from a 10-year, 24-hour design storm.

POTENTIAL BENEFITS

The development of design aids was initiated to develop area specific design methods that give reasonable assurance that storm water discharges from construction sites meet desired sediment performance standards without the lengthy design process typically associated with designs developed to meet a performance standard. This approach benefits regulatory agencies and developers because the time required for design of controls for "typical" situations would be straightforward and minimized. Plan reviewers do not have to labor through detailed calculations. The use of area specific design methods provides a means of achieving sediment control without the steep learning curve associated with simulation techniques. This allows engineers to gradually gain experience and expertise in design of sediment controls. As reviewers and planners become more experienced with the procedures, they may move to modeling techniques or other methods (for large scale developments or in sensitive areas). It is still anticipated that site specific data and other procedures such as modeling be used for detailed evaluation of sediment controls. Adoption of area specific design techniques among state and local agencies helps to standardize use of the practices, reduce confusion and promote adoption of design techniques.

METHODOLOGY

The project began with site visits at numerous locations in each of the land resource areas of the state in order to see innovative methods, as well as areas needing improvement. This in-field assessment indicated the practices of choice and preferred techniques and practices to comply with state law. From this assessment a list of practices were selected. Evaluation of existing modeling capabilities led to major revisions in the SEDIMOT II Model to allow evaluation of a wide range of sediment control technologies in a seamless manner. Input data bases were generated for all major land resource regions and results from almost half a million runs of the model were used to develop simple design aids for sediment ponds, rock ditch checks and filter fences.

The tour of South Carolina construction sites revealed that channel erosion was a significant problem in many watersheds, indicating a need for adding a channel erosion component to the model since the existing routine in SEDIMOT II allows only for deposition in channels. After investigating possibilities for modifying existing routines in SEDIMOT II, it was determined that the inaccuracies in hydraulic routing when the pond routine is used for small structures and the lack of adequate sedimentation routines in the check dam routine meant that a major program modification was necessary. Because of the availability of a new hydraulic routine that is accurate over a wide range of structural sizes and types, it seemed prudent to make such a modification.

The process used was to:

- Develop a common model for reservoir routing which utilizes continuous functions for discharge and stage storage rather than discrete stage points.
- Develop physically based and tested methodologies for predicting stage discharge relationships for commonly used sediment control structures.
- Combine these routines with the CSTRS routines used in SEDIMOT II.
- Modify the model to include channel erosion.

After each of these tasks was accomplished, graphs of trapping efficiency versus ratios that contain parameters involved in hydrology and sedimentology were plotted. Numerous ratios were compared in these preliminary graphs. For example in the development of the pond design aids, ratios included volume of storage at the riser, maximum or average elevation compared to volume of runoff, peak outflow rate divided by areas at the riser, maximum or average elevation and divided by reference settling velocities for D_{15}, D_{35}, D_{50}; detention time; and riser, maximum or average surface areas. A ratio was sought that utilized inputs that could

be readily obtained and that provided a grouping of data points so that a curve could be drawn that would represent a conservative estimate of the trapping efficiency. Two of the preliminary graphs are shown as Figures 1 and 2. Figure 1 shows data for two soil conditions having substantially different eroded size distributions. The Piedmont fine condition and the Sandhill coarse were used in the preliminary analysis because they represent the extremes in soils data and it was desired to have a reduced data set for the initial investigations. The ratio used in Figure 1 was not deemed adequate for use in a design aid because there is little variation in trapping efficiency for a wide range of ratios for one soil and a wide range in trapping efficiencies for the same ratio for the other soil. Figure 2 shows data for the Piedmont fine condition. In Figure 2, the trapping efficiencies are grouped much closer as a function of the ratio for the soil. Additionally, the terms required to calculate the ratio are readily obtainable. Many more alternative graphs were produced before the final ratios were selected. Prior to analyzing the data, it was anticipated that it would be necessary to have a graph for each soil condition in each land resource area (i.e., 12 graphs would be required). However, after the data were plotted and overlays were developed, it became apparent that all conditions

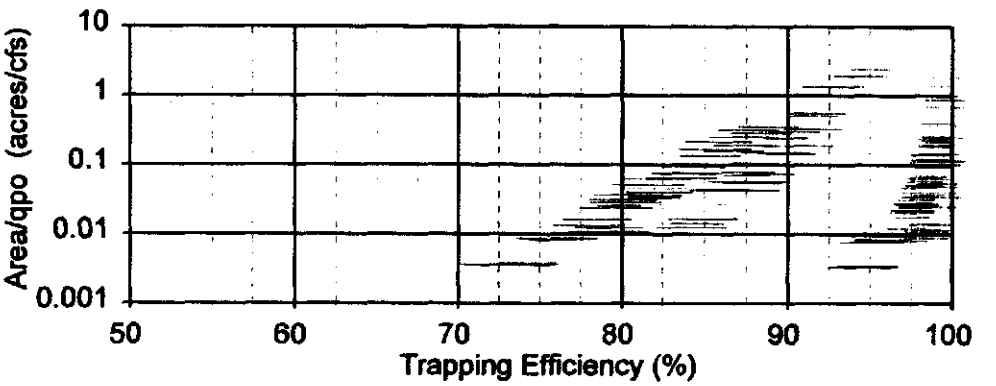

Figure 1. TE vs area/qpo—average area. Sandhills course and Piedmont fine—bare soil.

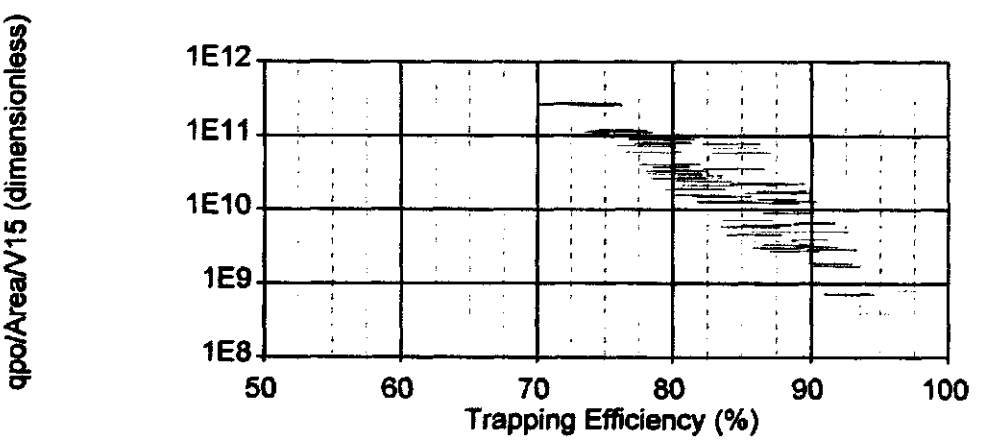

Figure 2. Trapping efficiency vs 1po/[(A)(V15)]—average area. Piedmont fine—bare soil.

except the high water table condition in the tidal area could share the same line. This finding greatly simplified the construction and use of the design aids.

The selected ratios led to graphs that can be used as an aid for designing sediment control structures that are described in subsequent sections. It should be recognized that aids such as these are developed for typical conditions in South Carolina. Other methods should be used if the situation is environmentally sensitive or hazardous. In all cases, good engineering judgment should be considered as an essential ingredient in design.

POND DESIGN AIDS

The design aids will be briefly described and then examples will be used to demonstrate their use in realistic problems. A common feature of each of the design aids is that a characteristic settling velocity for the eroded soil must be obtained. The characteristic settling velocity corresponds to an eroded particle diameter that is referred to as D_{15}. This diameter corresponds to a point on the eroded particle size distribution curve such that 15% of the particles (by weight) are equal to or smaller than this size. Estimated eroded size distributions for South Carolina soils using an adaptation of the method described by Foster, et al. (1985) have been previously developed. The procedure uses the primary particle size information reported by the USDA Soil Conservation Service as part of county soil surveys. The information is now available from the South Carolina Department of Health and Environmental Control. By plotting "fraction finer than" versus "diameter," D_{15} can be read. If D_{15} is less than 0.01 mm, then settling velocity based upon a simplified form of Stokes Law is:

$$V_s = 2.81 \times d^2 \quad (1)$$

where V_s is settling velocity in ft/sec and d is diameter in mm. If D_{15} is greater than or equal to 0.01 mm, then settling velocity should be found using

$$\log_{10}V_s = -0.34246 \times (\log_{10}d)^2 + 0.98912 \times \log_{10}d - 0.33801 \quad (2)$$

where V_s, is settling velocity in ft/sec and d is particle diameter in mm (Wilson, et al., 1982).

Eroded particle size distributions used in sediment control design are frequently quite different from primary size distributions that are often determined for other construction purposes. The user should note that D_{15} is often smaller for coarse textured (more sandy) because of the reduced clay content and the lack of aggregation.

Figures 3 and 4 plot the ratio $q_{po}/(A \times V_{15})$ versus percentage of trapping efficiency. For ponds, the ratio was found to be as shown below.

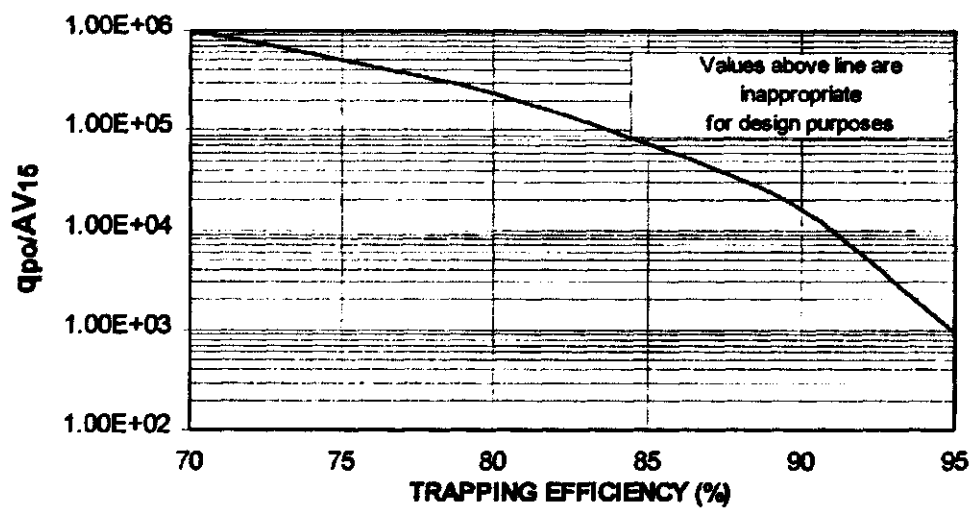

Figure 3. Design aid for estimating trapping efficiency for ponds not located in low-lying areas with high water tables.

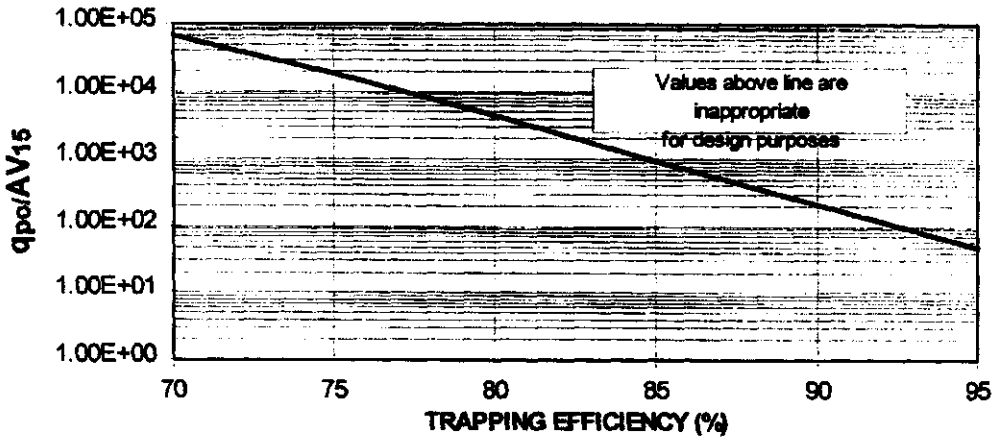

Figure 4. Design aid for estimating trapping efficiency for ponds located in low-lying areas with high water tables.

$$Ratio = q_{po}/(A \times V_{15}) \quad (3)$$

where q_{po} is peak outflow rate from the pond in cfs, A is the surface area of the pond at the riser crest in acres, and V_{15} is settling velocity, in fps, of the characteristic eroded particle corresponding to D_{15}.

Two curves are presented below. Figure 3 is for soils including Piedmont, Sandhill, Coastal and Tidal area soils, except as noted subsequently. For the Piedmont, Coastal and Tidal areas, soils are classed as either coarse (sandy loam), medium (silt loam), or fine (clay loam). Sandhill soils include coarse (sand), medium (sandy loam), and fine (silt loam) because of the prevalent textures in this region. These classifications are summarized in Table 1. Figure 4 is for tidal soils (sands and sandy loams that are classified in hydrologic soil group D because of high water table). The ratio should be less than or equal to the curve value at any given trapping efficiency. For example, at 80 percent trapping efficiency, the ratio is equal 2.2E5 for most soils as shown in Figure 3. If the ratio $q_{po}/(A \times V_{15})$ intersects the curve at a point having a trapping efficiency less than the desired value, the design is inadequate and must be revised. Upper limits on site conditions for ponds are included with Figure 3. *Ratios above the design curves are not recommended for any of the design aids.*

Constraints for use of Figures 1 and 2 are as follows;

- Watershed area less than or equal to 30 acres
- Overland slope less than or equal to 20 percent
- Outlet diameter less than or equal to 6 feet

ROCK DITCH CHECK DESIGN AIDS

Design aids for rock ditch checks were developed similarly to those for ponds. Again the D_{15} characteristic value was used for calculation of the settling velocity. The ratio for ditch checks was found to be as shown below.

$$Ratio = S \times q^{(1-b)}/(a \times V_{15}) \quad (4)$$

where S is the channel slope in percent, q is flow through the check in cfs/ft, V_{15} is the settling velocity in fps, of eroded D_{15} size particle in mm, and a and b are coefficients. The coefficients are determined from curves shown in Haan, et al. (1994). Also, given in Haan, et al. (1994) are methods to estimate flow through rock checks and overtopping potential. If the check overtops the trapping, efficiency is assumed to be zero. Three plots are shown that correspond to fine, medium and coarse textured soils. Figure 5 represents the design aid for ditch checks in coarse soils. Figures 6 and 7 represent the same for medium and fine soil conditions. Table 1 provides guidance to determine which plot is appropriate based on soil conditions.

Constraints for the use of Figures 5 through 7 are listed below.

- Watershed area is less than or equal to 5 acres
- Overland flow length is less than or equal to 500 feet
- Overland slope is less than or equal to 15 percent
- Maximum depth of the ditch is less than or equal to 6 feet

Table 1. Soil Textures by Group for Each Land Resource Area.

Land Resource Region	Coarse	Medium	Fine
Piedmont, Coastal and Tidal	Sandy Loam	Silt Loam	Clay Loam
Sand Hills	Sand	Sandy Loam	Silt Loam
Tidal (High Water Table)	Sandy Loam	Silt Loam	Clay Loam

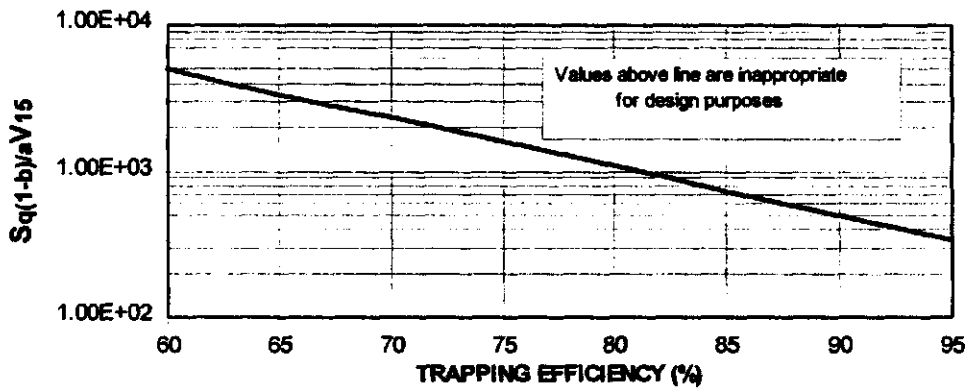

Figure 5. Design aid for estimating trapping efficiency of rock ditch checks with coarse soils.

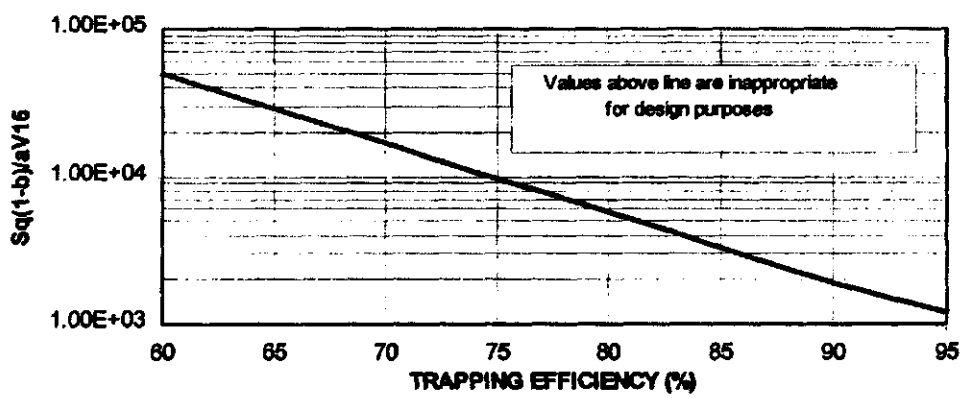

Figure 6. Design aid for estimating trapping efficiency of rock ditch checks with medium soils.

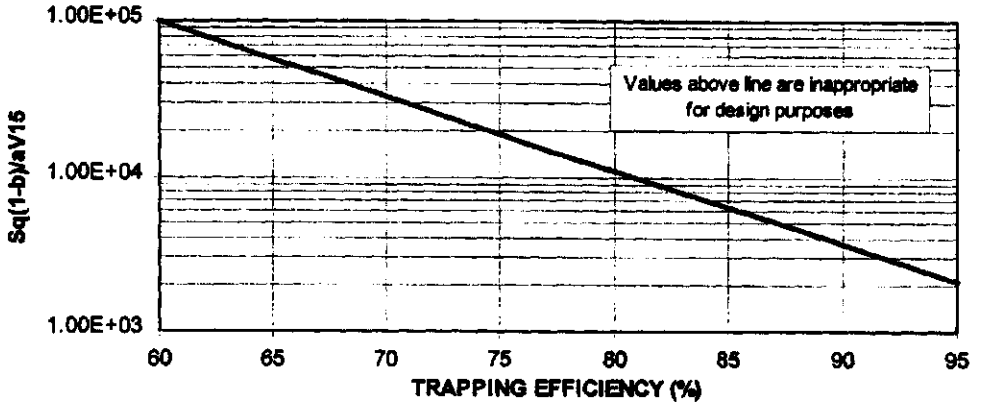

Figure 7. Design aid for estimating trapping efficiency of rock ditch checks with fine soils.

SILT FENCE DESIGN AIDS

The design aid for silt fence applies to silt fence placed in an area down slope from a disturbed area where it serves to retard flow and cause settling. Two conditions must be met for a satisfactory design.

- Trapping efficiency must meet the desired level of control.
- Overtopping of the fence must not occur.

One of the most important considerations in silt fence design is to specify regular maintenance. The silt fence design aid is a single line grouping all soil textures together. A similar procedure was used for development of the ratio as used for the ponds and rock checks. For the silt fence, the ratio was found to be as shown below.

$$Ratio = q_{po}/(V_{15} \times P_{area}) \quad (5)$$

where q_{po} is the peak outflow through the fence, in cfs, V_{15} is settling velocity, in fps, of the eroded D_{15} size particle, and P_{area} is the potential ponding area up slope of the fence in ft^2.

The ponded area can be estimated by using the height of the fence available for flow, and extending a horizontal line from the fence to an intersection with the ground surface up slope of the fence. This is described by the available fence height times the ground slope. Multiply this distance by the available length of fence for ponding to obtain the potential ponding area. Then, calculate the ratio and enter the graph to determine the efficiency. Once an acceptable trapping efficiency is determined, a calculation for overtopping must be done. This calculation must be done using the slurry flow rate through the fence and checked against the incoming flow and determine if enough storage exists behind the fence to prevent overtopping. Figure 8 gives the curve for silt fence design.

Constraints for the use of Figure 8 are listed below.

- Watershed area is less than or equal 5 acres
- Overland flow length is less than or equal to 500 feet
- Overland slope is less than or equal to 6 percent
- Slurry flow rate through the fence is less than or equal to 10 gpm/ft
- Maximum height of the silt fence is less than or equal to 3 feet

ESTIMATING D_{15} AND V_{15}

A common feature used in all of the design aids is a characteristic settling velocity for a specific diameter of the eroded size distribution. For South Carolina conditions this velocity corresponds to an eroded size such that 15 percent of the sediment has particles smaller than the size specified. The procedure for empirically estimating eroded size distributions is best described by Hayes, et al. This procedure may be used with USDA Soil Survey data or site specific soil boring data. Other procedures are given by Haan, et al. (1994) for physically based estimating procedures. It is important to remember that the eroded size distribution is the most critical parameter in sizing sediment controls. The eroded particle size distributions vary greatly from primary particle size distributions that are often determined as a result of soil strength investigations for construction purposes.

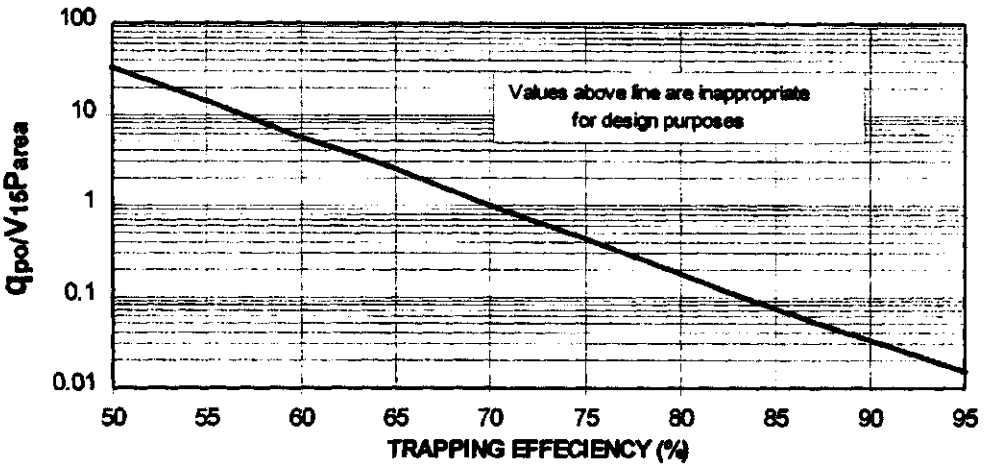

Figure 8. Design aid for silt fence trapping efficiency.

EXAMPLE PROBLEM

The example problems serve to illustrate the use of the design aids for calculation of trapping efficiency for various types of structures. Basic soils, hydrologic, and hydraulic information are combined. Methods as required by Standards for Stormwater Management and Sediment Reduction (72-300) may be used to estimate the peak flows. Other methods of estimating peak flows such as the Rational Method may be used, but are not recommended. Site specific soils information can generally be found from soil surveys. On site soil boring data may be used to generate this information as well. Hydraulic information is obtained by combining site and structural information.

In all cases, a ratio is calculated. The ratio is used to locate the point on a turning line for the specified conditions and structure. Trapping efficiency is found by reading the corresponding point on the x-axis estimating the trapping efficiency. These designs aids are intended to be slightly conservative, but use of these methods should not replace the use of good engineering judgment. Questionable results should be investigated by the engineer. Installation and maintenance should be considered. For example, it may be appropriate to add baffling to a pond in order to prevent short circuiting between the inflow and outflow locations.

It should be noted that these design aids are intended for "typical" structures. Extreme or critical conditions necessitate that more detailed analyses be conducted. For example, sensitive areas in steep terrain would be an example of an extreme situation. Also, it is assumed that the user has a working knowledge of hydrology and hydraulics.

Example Problem Pond Design

A sediment pond is to be constructed on a 30 acre commercial site in Richland County, South Carolina. The following information is available for the site based on soil, hydrologic, and hydraulic conditions.

Given:

- The eroded particle size distribution is for a coarse soil (Pelion and Fuquay mix) with D_{15} set equal to 0.024 mm because the smaller D_{15} is associated with the Pelion soil.
- Peak outflow from the pond cannot exceed 11.2 cfs.
- Allowable surface area of the pond at the riser crest is 1.67 acres.

Solution:

Determine whether the sediment pond is adequately sized for satisfactory trapping efficiency.

- Calculate settling velocity V_{15} = 0.0014 fps.
- Calculate the ratio q_{po} /(A x V_{15}) = 11.2/(1.67 x 0.0014) = 4650 = 4.6E3.
- Enter Figure 3 on y-axis with ratio = 4.6E3, go to line and turn to x-axis to read trapping efficiency.
- Trapping efficiency is equal to 93%.